WELCOME TO
IDEA SHOP 2

- Projects galore
- Editor’s-choice tools
- Shop heating & ventilation
- Dust-collection solutions
- Tool-storage options

Build this all-purpose MOBILE WORKBENCH
Complete plans on page 46

TOOL TEST: Oscillating spindle sanders under $700
MEET THE MEN BEHIND

IDEA SHOP 2™

Taking a breather in the now-completed IDEA SHOP 2 (from left to right): Jim Harrold, Jim Downing, Bill Krier, me, Don Wipperman, Chuck Hedlund, and Jim Boelling.

Readers, I've got to be honest with you. After we completed our first IDEA SHOP in 1992, I wondered how we'd ever manage to match that effort. At the time, it seemed like we had used up every available good idea and included it in that shop. So, even though I didn't share my sentiments with the staff, it was with some trepidation that I asked for volunteers to help create our encore effort, IDEA SHOP 2—THE GARAGE.

As you'll see on page 42 where our shop tour begins, my doubts were unfounded. In many ways, this shop is even better than our first. Why? For one thing, it could cost us a lot less to build and equip. For another, this one fits into a space that most of you already have. And believe it or not, IDEA SHOP 2 actually has more ideas in it than the first one did.

I won't spoil your fun by revealing more about the shop here, but I do want to single out some people without whom this project would not have been possible. First, I'd like to thank WOOD® magazine staffers Jim Harrold, Jim Downing, Jim Boelling, and Bill Krier for helping plan, design, and execute our vision.

My hat also goes off to Don Wipperman and Chuck Hedlund—two of the most experienced and gifted cabinet builders around—for helping us build several of the projects. Guys, you came through when the schedule got tight.

Two of our loyal readers also figured prominently in the success of our effort. Erv Roberts of Des Moines, Iowa, shared with us his design for the drop-leaf workbench featured in the shop. And Arthur Van Den Berg of Two Rivers, Wisconsin, tipped us off to his tool-mover design. Thanks, fellas; we appreciate your valuable input.

And last but not least, let's have three cheers for the manufacturers and suppliers who worked with us in outfitting our shop. They're all listed on page 68.

Photograph: Wm. Hopkins

Larry Clayton
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This issue's cover wood grain: Butternut
After 65 years as America's premier tool supplier, we've truly become an American tradition. That's why it's no surprise that craftsmen like you pass on their enjoyment of our tools from one generation to the next.

We're rather proud of that tradition, too. Because it says a lot about the quality and durability of Craftsman tools.

Check out our complete line of radial saws. There's a host of features - like the patented blade guard and the easily accessible carriage bearings. Or take a look at our new wholeshop sawdust collection kit. Attached to your tools, it carries away most of the sawdust that would normally settle around your shop.

You can see the complete line of Craftsman power tools at your local Sears store. Or for convenience, we offer the "Sears Shop At Home" service: 1-800-377-7414.

CRAFTSMAN®

Only at Sears

Wholeshop sawdust collection kit attaches to most stationary and benchtop power tools.
Waxed scrollsaw table increases control

I found "Rick’s Tricks for Scrollsawing Success" from the December 1993 issue informative and helpful. I have an additional tip.

When sawing pine or other resinous woods, the wood will sometimes stick to the table and cause the cut to veer off the cut line. For a solution to this problem, I apply a coat of paste wax to the scrollsaw table, and I’m back on line.

—John Garland, Lesterville, Mo.

Voltage is important, too

Your answer to the “Ask WOOD” question about motor horsepower in the January 1994 issue failed to include any mention of voltage of the motors. For the novice comparing motors on amperage draw only, this can be a problem. The comparison must be made on motors of the same voltage (110 or 220 volts) to be valid.

—H. R. McKenzie, Tyler, Texas

Spinning your brush finishes the job

The “Brush Basics” article in the January 1994 issue was informative on brush selection and care. Your advice to avoid skimping on brush quality makes good sense, but the article did not mention the use of a “brush spinner” for final cleaning. I use one made by Shur-Line Mfg. of Lancaster, N.Y., to spin the brush and release the final cleaning residue inside a bucket or trash can.

—William B. Graham, Tujunga, Calif.

We contacted Shur-Line Mfg. at 716/683-2500, and found out that this brush spinner also works for cleaning paint rollers.

Safer rust removal

Several years ago, the Early American Industries Association published a rust-removal process similar to the one you printed in the September 1993 issue of WOOD® magazine. The following issue of the association’s bulletin immediately pointed out not only the danger of using lye, but also a much safer substitute: sodium carbonate. I have found sodium carbonate in grocery stores in the form of Arm & Hammer Washing Soda, a detergent booster.

The EAI’s article recommends using a heaping teaspoon of sodium carbonate per quart of water. A stronger solution can be used, but will not speed up the process very much. You must still use care in handling this product.

—Robert C. Brackett, Hendersonville, N.C.

That’s some stubborn plank!

The “Wood Anecdote” in the February 1994 issue brought back a memory. I was stationed at Milne Bay, New Guinea, during World War II. We found a 2”x12”x16’ plank that was left from a ship’s dunnage (cargo supports and bracing), and we needed to move it out of our way. It was so heavy it took two men to justudge it.

My platoon officer ordered me to get an axe and chop the plank in half. I took one good lick at the board, and it was hardly dented. We finally ended up dragging the thing into the jungle and leaving it there. It’s probably still there for all I know.

For lack of identification, we called that plank “ironwood.” I now wonder if it could have been the “turpentine” wood you wrote about in your article. I have worked with several hardwoods, including hard maple, and none of these were as hard as that mystery plank.

—E. H. Vandemark, Dunsinane, Colo.

New design of an old tool

In the article “He Makes Old Tools Sing Again” in the September 1993 issue, Jim Price mentioned an old tool called a scratch stock that intrigued me. I tried to buy one of these tools, but couldn’t find a supplier. After a little research and experimentation, I came up with the design shown below, and used it for making my version of a scratch stock. I grind my scratch-stock blades from dull or broken reciprocatingsaw blades.

—Richard A. Murphy, Clifton Park, N.Y.

Continued on page 6
Deserve the best cuts

When your work requires absolute precision and quality cuts, there is no substitute for the Freud LU85 -- at any price.

The LU85 produces a flawless cut that requires no sanding. It eliminates chipping and will improve the fit and beauty of your most demanding projects.

Only the award winning LU85 can give you this kind of performance, because no other blade is manufactured with the same care, strict tolerances and fine materials.

The exclusive long-life, titanium-bonded micro-grain carbide tips are ground with special angles, and the laser-cut extra stiff plate is bonded with a thick layer of Teflon® using a special process. This allows the blade to glide through the wood and eliminates pitch build-up.

The LU85 is a precision cut-off saw, ideal for your mitre saw or table saw, for the cutting of natural woods, low pressure laminates and mouldings.

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An angle on cutting tapered workpieces

Bill, we cut the long angles on our bird-feeder ends with a bandsaw, and then sanded the edges to the pattern line on a disc sander. However, if you are making several feeders, we suggest you use the tablesaw jig shown in the drawing right. Make this jig from 1/4" plywood, fastened to a 3/8" x 3/4" x 15" (or sized to fit your saw) hardwood guide for the miter-gauge slot. Measure the distance from the miter-gauge slot to the sawblade, and add 1/16". Transfer this measurement to the plywood base, and glue and screw the hardwood guide outside of these marks. Then, cut the jig to size by placing it in the miter-gauge slot and passing it through the blade.

To make the end panels, first cut them to the size listed in the cutting diagram in the bird-feeder article. Draw the long side angles on one end piece, and use this end as a guide for mounting the small placement blocks on the jig. Fasten these blocks in place with brads or small screws.

Place the end piece in the jig, and cut an angle on one side. Turn the end over, and cut the second angle. You can now produce as many bird-feeder ends as you wish.

Where's the bowl in this log?
The Ask WOOD answer "Check those cracks" from the December 1993 issue raised a question: Which is the best side of a bowl blank to fasten to the faceplate?


We prefer to mount the bowl blank with its face grain glued to a wooden disk or auxiliary faceplate. Ted, we then fasten this auxiliary faceplate to the lathe faceplate with wood screws. Otherwise, the determining factor of how to mount a bowl blank to the faceplate will be how you want the grain to appear on the finished bowl. There should be no problem with warpage or cracking, provided that your bowl blank is properly cured. See the drawing right to determine how mounting the bowl blank on the faceplate will affect the grain direction of the bowl.
THE FINEST SAW FROM ANY ANGLE.

With an unbeatable combination of breakthrough features and advanced technology, Makita's model LS1211 is the most revolutionary compound saw available today. Its unique design and powerful 15 AMP motor allow miter, bevel, and compound cuts to be made quickly and precisely. And unlike any other saw on the market, the LS1211 can bevel cut up to 45° to the right. What this means is that you can cut virtually any angle with the LS1211.

Makita has also added as standard equipment a 96 tooth carbide tipped blade that produces a super fine cut. Innovative and versatile from any angle, Makita's Slide Dual Compound Saw is a revolution in power tools.

Makita
IT'S ALL THE POWER YOU NEED.

Makita U.S.A., Inc., 14930 Northam St., La Mirada, CA 90636-5753
Magnet bristling with brads ends pounding headache
You're assembling a project with brads, but you may as well be wearing mittens as you try to pick up the tiny brads from the workbench or out of the box.

TIP: Put a bunch of brads on a magnetic pick-up tool. Drill a hole that fits the handle of your tool in a block of scrapwood. Then, instead of pouring out some brads, poke that pickup tool into the box and bring out a cluster of brads. Stand the tool in the block of wood. Now, pick brads off the magnetic tool one at a time for fumble-free nailing. Don't have a magnetic pick-up tool? Tape a craft-store magnet to a scrap of dowel rod.

—Frank H. Day, Anaconda, Mont.

Clamp reaches out with added fittings
Pipe clamps work best on glue-ups that, like some rivers, are wide but not very deep. So, what do you do when you need a clamp with longer reach?

TIP: Thread together \( \frac{3}{4} \)" black-pipe fittings to fabricate a set of sliding extension jaws for a \( \frac{1}{2} \)" pipe clamp. Pick a nipple length that fits the situation, and then thread a tee fitting on one end, and a 90° elbow on the other. Make two such jaws. Remove the sliding jaw of the pipe clamp and slip the tee fittings over the pipe. With the open ends of the elbows face inward. Replace the sliding jaw, and clamp your project, protecting the wood from the rough iron of the elbows.

—E. E. Reynolds, North Charleston, S.C.
In a durability test, the competitor’s hammer lasted 60 seconds. If you happen to need one for longer than that, buy a Stanley hammer.

This picture tells the story better than any words can. In our oversize tests, the Stanley hammer outlasted the competitor’s brand by a 4 to 1 ratio.0

You see, after years of research (and a whole lot of sleepless nights) our engineering department concluded that jacketed, solid-core fiberglass is more durable than the compression-molded variety some of our competitors use to make their hammers.

That’s the Stanley philosophy. Don’t quit working until your product is perfect. You’ll find this kind of dogged determination across the board at Stanley. In everything we make. Like a garage door insulated to reduce noise. Or a closet organizer made with steel planks instead of wire so it doesn’t wrinkle your clothes.

It’s innovative thinking like this that’s kept us ahead of the competition for more than 150 years. At Stanley we’re not happy simply churning out products. We’re only happy when our products are better than anyone else’s.

*Oversize test conducted by striking hammer handle against metal object. ©1988 The Stanley Works.
Chains take pains from drying parts

When you have a lot of large parts to finish—such as shelves—spreading them out for drying can take up a lot of space. In a small shop, you may not have that space.

TIP: Chains and ceiling hooks can make drying racks that hold a lot of parts in a little space. Screw the hooks into ceiling joists about 12" from the wall (or other distance, as appropriate). Space the hooks as the parts require, and hang a 7–8' length of chain from each. Light-duty chain, such as the twisted-link variety, will suffice for most projects. On each part to be finished, center a screw or nail at each end. Hang the parts horizontally between the chains, placing the screws or nails into the chain links, as shown in the illustration at near right.

Using this same idea, you can hang parts vertically, too. Place a screw eye in one end of each part. Then, loop the chain between two ceiling hooks, and hang the parts from S-hooks on the chain, as shown below.

—Richard Trowbridge, Akron, Ohio

Continued on page 12
Say you've always wanted a good band saw. Or you've about given up trying to make precision cuts with your hand-held circular saw. Or perfect holes with a portable drill.

Tough to know just where to start. Do you go the "big buck" route or try one of those "cheapo no-names"?

This'll help. Delta has been the choice of professional woodworkers for 75 years, now. And the tools you're looking at are built with the same heft and precision we put into our professional tools. Yet they're priced to fit comfortably into any shop.

Whether you're in the market for a bench saw, band saw, scroll saw or drill press, Delta tools are a great place to start.

The scroll saw features our Quickset™ blade changing system. The band saw, our Quickset™ blade tensioning system. So you'll spend more time cutting and less time messing around with blades. And that 12" Portable Planer will have you surfacing your own stock, from 1/8" to 6" thick, up to 12" wide. In your own shop.

They're just part of the broadest line in the industry. Woodworking tools for the master craftsman, the weekend do-it-yourselfer and everyone in between.

Delta. If you think it's time you got some professional help. Call toll-free for the name of the nearest dealer, home center or hardware store carrying Delta tools. Delta International Machinery Corp., 800-438-2486. In Canada, 519-836-2840. Delta is a Pentair Company.
Rabbet on tablesaw fence helps you trim panels flush
You've glued some solid-wood edging on a set of plywood panels and now it's time to trim the edging flush. If you don't have a flush-trim router bit, is band planing the only solution?

TIP: If you own a tablesaw, you're just an auxiliary fence away from a super-quick solution. Make a 1x6" wooden auxiliary fence for your tablesaw, and cut a rabbet in its face exactly as wide as the kerf of your blade. Attach the auxiliary fence to your regular rip fence and position it so that the outside edge of the blade is flush with the outside face of the auxiliary fence, as shown in the drawings below left. Then, run your workpiece along the fence to trim off the excess edging. We use a 50-tooth, carbide-tipped blade for clean, splinter-free results.

—from the WOOD magazine shop

Continued on page 14

Tips from Franklin International
Makers of Titebond Wood Glue

Chalk Point

All water-based wood glues have a minimum bonding temperature, a property known as a chalk point. Although this critical temperature is different for each product, each glue must be used above this point.

- When a glue dries at or below its chalk point, it dries white and produces a very low-quality bond.
- If the glue you are using dries uncharacteristically while, it has likely dried too cold. In this case, sand off the white film of glue, allow the materials being bonded to warm up, then reapply.
- Remember, the glue in the bond line will dry at the temperature of the wood, so make sure the wood itself is above the chalk point of the glue.

For more information call 1-800-347-GLUE

Please see our full-color ad on page 10.
Our new sander takes care of details others haven’t even thought of.

Most corner sanders just scratch the surface compared to the new Bosch B7000. For example, its motor not only delivers 1.1 amps of true orbital action but also minimizes annoying vibrations.

What’s more, to meet the demands of jobs ranging from scraping to polishing there’s a wide selection of optional pads. Hook-and-loop backings make them easier to change than messy adhesives. Plus, unlike the competition, pads and head points last longer thanks to the exclusive Clic™-adjustable head.

For added versatility, a pad extender accessory gets the B7000 into places other corner sanders can’t touch. And for a cleaner workplace, a dust extraction port is included as standard equipment. Another thing that’ll make you breathe easier is its one year warranty, 90 day satisfaction guarantee and one year service protection plan.

Be sure to get the corner sander that’s cornered the market on performance, the B7000 from Bosch.
The Dremel Moto-Tool® is the compact, high-speed rotary tool that's extremely versatile. With speeds from 5,000 to 30,000 rpm and more than 150 available bits, it lets you handle almost any job. Use it on wood, metals, ceramic tile, glass, fine silver, plastics, laminates and more. Look for our book 175 + USES in specially marked Moto-Tool packages where power tools are sold. Or write: Dremel, Dept. W, P.O. Box 1468, Racine, WI 53406-1468 for a free copy.

DREMEL®

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**TIPS FROM YOUR SHOP (AND OURS)**

Continued from page 12

Extended jaws improve clothespin clamping

Spring-type clothespins make great clamps for small work. But they'd be even handier sometimes if the jaws opened wider for clamping thicker parts.

**TIP:** Extend the jaws by gluing scrapwood or Popsicle sticks to the clothespin where shown. Woodworker's (yellow) glue or epoxy will hold the lengthened jaws in place, but be sure to allow the glue to achieve full strength before putting the clothespin clamps into service.

—Joseph Loducca Sr., Fenton, Mo.

Put on lipstick to kiss lock misalignment goodbye

For your drawer lock to work properly, the lock bolt must slide smoothly into the mortise (or hole) you make for it. But, trying to measure and mark that location is driving you crazy.

**TIP:** Extend the lock bolt and put lipstick on the end of it. Retract the bolt, close the drawer, and then extend the bolt. The lipstick will mark the correct position for the bolt hole or mortise. You can mark door locks and cabinet latches this way, too.

—Cynthia Hewitt, Grants Pass, Ore.

Continued on page 16
THE PREDATOR. IT TOOK PANASONIC TO ENGINEER TECHNOLOGY THIS BIG INTO A POWER TOOL THIS COMPACT.

3/8" HEAVY DUTY KEYLESS CHUCK

PLANETARY GEAR SYSTEM

POWERFUL 12-VOLT MOTOR

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174 IN. LBS. OF MAXIMUM TORQUE AT ALL SPEEDS

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Feature for feature, ounce for ounce, The Predator offers the professional more power and better performance than any cordless power tool has a right to. Because it's precision-crafted to offer a power-to-weight ratio that tackles even tough jobs with minimum fatigue. Small enough to work in tight spots. So powerful it devours work.

The "Ironman" high-capacity battery pack, another innovation from Panasonic, delivers more work per charge and uses our 15-minute "Coffee Break" charging system.

And like all Panasonic power tools, The Predator cordless tool comes with our 30-day quality satisfaction guarantee. Your satisfaction will long outlive the guarantee.

*30-DAY QUALITY SATISFACTION GUARANTEE: If you are dissatisfied with any Panasonic Cordless Power Tool for any reason, simply return it to the place of purchase with a dated proof of purchase and all accessories, parts and instructions within 30 days of the date of purchase for a full refund, or call Panasonic at 201-392-6665. Abuse or misapplication of any power tool voids the guarantee.
TIPS FROM YOUR SHOP
(AND OURS)

Continued from page 14

One-step wheel painting with dowel rod and coat hanger

Painting one side of a small wooden wheel, waiting for it to dry, and then painting the other side takes a lot of time and often leaves you with overlapping paint streaks.

TIP: With this holder you can
paint both sides of the wheel at the same time and dry the finished wheels on an old coat hanger. Start by driving a brad through a dowel rod that fits into the axle of the wheel. Bend the point of the brad up parallel with the length of the dowel.

Next cut one end of an old coat hanger and form a loop as shown at below. Paint one side of the wheel, then pick it up by inserting the dowel rod in the axle hole. With the wheel balanced on the brad, paint the other side and then transfer the finished wheel to the coat hanger using the dowel rod. When you're done painting, insert the bottom of the coathanger in the loop so the wheels don't fall off. Then hang them up to dry.

—David Burr, Rockville, Md.
Here's the third hand you always wanted: the revolutionary QUICK-GRIP Bar Clamp.

Its unique pistol-grip handle lets you hold the clamp and adjust jaw pressure with just one hand – an easy solution to even the most demanding clamping problem. For wood, plastic or other materials, the new QUICK-GRIP Bar Clamp makes any job easier and faster.

The QUICK-GRIP Bar Clamp was named one of Popular Science's top 100 new products. You'll know why, the first time you hold one in your hand – it's light, strong, quick to use. It's just what you'd expect from the makers of VISE-GRIP® Tools.

Hold everything.

Available from your American Tool distributor.
NOW! PLANE, MOLD, SAND and SAW with

Infinitely Variable Power-Feed!

MAKES YOU MONEY... SAVES YOU MONEY!

Put this versatile power-feed tool to work in your shop... see how fast it pays for itself! Quickly converts low-cost rough lumber into valuable finished stock. Turns out perfect picture frame moldings, quarter-round, casing, tongue and groove... all popular patterns... any custom design.

"Just a twist of the dial" puts twice as many cuts-per-inch at your fingertips as any comparable planer - from 70 to over 1,000 CPI! This heavy-duty machine will sail through even the toughest oak at higher speeds, or you can slow it down to handle those "hard-to-work" pieces like curly maple, knotty cedar, burls, knees and much more! A valuable feature for molding work, where profiles make sanding impossible.

"Change to Molding, Sanding or Saving in just minutes!" Unique "Morse-Taper" Quick Change Cutterhead guarantees fast changeover... bearings remain factory set... precisely aligned at all times.

"Now choose from three powerful models!" Woodmaster introduces the first 18" and 25" Planer/Molders... with all the features that have made the 12" model the most versatile Planer/Molder on the market! Send for Free Facts today!

Woodmaster’s Quick-Change Molding Head lets you create custom moldings from any stock. Choose from over 250 standard trim and picture frame patterns... or design your own!

Power-fed sanding speeds production and improves the quality of your work. No more waves or cross-grain scratches. Separate sanding head installs in just minutes.

New ripsaw attachment lets you gang-rip with power feed in a fraction of the time it takes for multiple hand-fed passes on an ordinary table saw.

Here’s What Woodmaster Owners Say:

Shop Test Results—"It does an excellent job of planing, on a par with more expensive machines, and even better than some commercial models."

Editor, Workbench Magazine

Best Value—"After checking them all, Woodmaster was obviously the best deal for the money. Also, I would like to acknowledge the polite and prompt service."

E. D. Holtz, North Carolina

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RECORD IS GIVING AWAY A
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We’re making this great offer to introduce you to remarkable Record Woodworking Vises...the quality vises that defy comparison!
Remember, before you buy - always compare and you’ll insist on Record! You should ensure that the sliding jaw and body are finely cast from grey iron. And, these components should be precision machined on computer controlled equipment for consistent repetitive accuracy so you don’t have to worry about ‘getting a good one’. Look at the vise side-on. When fully closed the jaws should meet only at the top, leaving a gap at the bottom. That gives you even clamping pressure on the whole depth of the workpiece. And, of course, countersunk holes should be provided so you can fit your own choice of wooden chevies to protect the work.
The steel main screw should have a batter thread and quick-release trigger mechanism. This discourages the main screw allowing the jaw to slide freely - saves a lot of time if you’re working with different widths of stock. The steel guide rods will be accurately made and fitted, reducing wear and providing a smooth parallel adjustment. And if you intend to install ‘stops’ along your bench top, you’ll find an adjustable ‘dog’ is a useful extra.

A FEW MORE TIPS FROM OUR WOODWORKING PROS

• Tired of grunting and groaning every time you have to move a big power tool? Take a look at the design for a mobile tablesaw base on page 53. You can apply this “wheelbarrow” design to many stationary power tools.
• Struggling with large, heavy sheets of plywood can strain your back and jeopardize your safety. To get a better handle on your sheet goods try our Roll Around Plywood Cart on page 34 and our Sheet Goods Support Rack on page 98.
• Shop manuals and paperwork often disappear, causing major headaches. An accordion-style file folder will fit neatly on any shop shelf and keep these important papers organized.

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 16

Pour a puddle of glue for easy plugging
Neatly applying woodworker’s glue to plugs can be tricky. You just can’t dribble a small stream out of the bottle.

TIP: Pour some glue onto a plastic jar lid or other suitable palette. Then, roll the bottom edge of the plug in the puddle of glue to apply an even coating right where you need it. Glue buttons, Shaker pegs, axle pegs, and other similar parts the same way.

—Glyn Roberts, Woodruff, Wis
**Glue up after staining**

I pre-stain many of the parts I make so that I can store and transport them, and later assemble the parts at craft fairs. Can you suggest an adhesive for joining these pre-stained workpieces?

—Doug Grimm, Riverside, Calif.

We don’t know of such a glue, Doug. We contacted the glue experts at Franklin International, manufacturers of Titebond-brand adhesives, and they confirmed our suspicions that the stain will interfere with glue penetrating the surface of the wood. This results in a weaker bond at the glue joint.

For a solution to your problem, we suggest that you mask the areas that will be glued. Remove the masking tape as soon as possible after staining the pieces to reduce the amount of tape-adhesive residue. This excess adhesive can be removed with lacquer thinner or acetone. The cleaner the joint surface (no stain, oil, finish, or other contaminant) the stronger the glue joint. Touch up any visible unstained areas after you assemble the project.

**Poplar as an outdoor wood**

We plan to replace a wrap-around porch on a Victorian home. I can buy readily available and reasonably priced 2"-thick poplar for making the many railing spindles. Is this a good wood to use for turning these spindles?

—Don Seymour, Beverly Hills, Fla.

Yellow poplar machines very nicely and provides an excellent surface for painting. However, this wood does not stand up well when exposed to the weather, and has more often been used for light interior construction, furniture, and interior trim. Redwood, cedar or Eastern white pine have greater decay resistance and a smaller seasonal dimensional change than poplar, and would be better choices for making these spindles.

Whichever wood you use, you can extend the life of these spindles with proper railing design and care. Be sure to prime and paint the spindles to protect them from the elements, paying particular attention to sealing the end grain. Angle the top of the bottom porch rail to prevent water from pooling around the spindle bases, and fill and seal all nail holes.

**More than just a name**

Why are some of the saw cuts called by a different name? For example: dado, rabett, lap, and groove?

—Russ Mobley, Thomson, Ga.

![Diagram of wood joints and cuts](image)

Thanks for asking, Russ. As experienced woodworkers, we tend to take these terms for granted, but some explanation is in order from time to time. These terms describe specific wood cuts, and allow woodworkers to plan or communicate exactly how they will build a project. We define these terms as:

1) A dado consists of a flat-bottomed, U-shaped cut that runs across the grain of the wood. Use a dado to mount shelves in cabinets or bookcases.

2) A groove is also a flat-bottomed, U-shaped cut, but it runs in the same direction as the wood grain. Use a groove to hold panels in door frames.

3) The term rabett describes a flat-bottomed L-shaped cut that runs along the edge or end of a board. Rabbets can run either across or with the grain. Use a rabett to inset a back into the sides of a cabinet.

4) Make a lap joint by joining two boards so that the face grain of one board crosses the face grain of the other. Cutting a series of parallel dadoes on both pieces where they intersect makes a half-lap joint. Use a lap joint to make X-style picnic table legs. Use a half-lap joint to make an egg-crate style window frame.

Continued on page 22
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What can I do with these trees?
My husband and I are buying a farm with harvestable black walnut trees. We are interested in using some of this timber in a home we are building. How can we find commercial sawmills that will turn the logs into sawn lumber and veneers for use in paneling and furniture?

—Pamela Adams, Cincinnati

Contact the Department of Natural Resources of your state, Pam, and request a listing of sawmills. For a list of veneer mills, contact: Hardwood Plywood Manufacturer's Assn. 1825 Michael Faraday Drive P.O. Box 2789 Reston, VA 22090-2789 703/435-2900

Veneering wall panels is an advanced and difficult procedure. For a simpler and more-durable product, we recommend you have the paneling made from solid wood.

Looking for a clear finish
I have searched for years for a finish that will not alter the color of the wood in my projects. What can I use that will not darken and obscure the grain of the wood?

—Ivan Walker, Fort Wayne, Ind.

For an answer, Ivan, we contacted Jonathan Kemp of H. Behlen & Bro., a finish manufacturer. His response: “Our water-based finish is water clear because it doesn’t have the solvents or resins that give an amber tint to the oil-based finishes.

“Water-based clear finishes dry quickly, with a two-hour recoat time. However, this finish falls between lacquer and polyurethane in the time it takes to reach full hardness or cure. To prevent marring the surface, wait 72 hours after applying the finish before you place anything on it.

“Water-based finishes contain only a fraction of the solvents found in oil-based finishes, and emit far less solvent odor while drying. Because these are water-based products, the initial coat of these finishes will raise the wood grain. Apply light coats and sand between applications to develop a smooth surface.”

Continued on page 24

How do the finest woods become your finest work?

The new AEG TXE 150 Random Orbit Sander: for the smoothest operation and finish. As Fine Woodworking said recently, this 6” dustless, variable speed sander offers a “…precision feel that’s hard to quantify; it just feels smooth.” Multi-port dust extraction makes perfect finishes easier, even on dark woods. The exclusive Automatic Brake System (ABS) virtually eliminates gouging and burning.

The new AEG Fixtec™ Barrel-Grip and Top-Handle Jigsaws: for precise, intricate cuts. Experienced woodworkers express amazement at the extraordinary results possible with these breakthrough jigsaws. The roller backup and ceramic guides prevent blade flexing for cleaner, more precise cuts with less finishing work. A patented keyless blade-changing system permits faster, easier blade changes.

For a tool demonstration, see your AEG distributor. Or contact the Electric Tools Division, Chicago Pneumatic Tool Company, 2220 Bleecker St., Utica, NY 13501-1793. Telephone: 1-800-234-0091.
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HOW I INCREASED MY BUSINESS BY DIMENSIONING WOOD MYSELF.

To produce wood to just the right dimensions for my patterns, my husband and I decided to buy an RBI 812 "3-in-1" Universal Woodplaner system. It prepares wood to just the right thickness. Now, I even sell these pre-cut patterns to area craft stores and my own customers.

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Susan

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ASK WOOD
Continued from page 22

A jig for hinge alignment
I have been unable to find a jig that will align hinges on the door and frame of cabinets and boxes perfectly. Drilling screw holes accurately is also a problem. Can you help?
—Dan Leadbetter, Tacoma, Wash.

A hinge-mortising jig, such as the one shown below, will help you cut aligned hinge mortises. Dan. Place this jig on the cabinet sides or rails, with the appropriate end touching the top or bottom edge of the door. Clamp the jig in place, and use a router equipped with a template guide bushing in its base and a straight bit to cut the mortise. Square the corners with a chisel.

Next, set the door in the cabinet, shimming the door to allow even spacing top and bottom. Mark the top and bottom of the carcace hinge mortises on the door. Remove the door, and use the marks to align the hinge mortising jig. Rout the mortise.

We suggest you consider using a Vix bit to drill the screw holes. These bits are designed with a tapered centering collar that ensures the screw hole will be placed in the center of the countersunk screw opening in the hinge. The Vix bit for #5 and #6 screws (part # 434265), and the one for #8 - #10 screws (part # 43273) are priced at $8.45 each. The Vix bit for #2 - #4 screws (part # 43281) costs $8.95 (plus $4.95 handling per order). You can order these bits from: The Woodworker's Store, 21801 Industrial Blvd., Rogers, MN 55374-9514. Or, call 800/279-4441.

Mount the hinges in the mortises with one screw in each leaf, then check that the door operates smoothly before installing the other screws. Lock the hinges in place with the remaining screws after the door is adjusted to move smoothly.
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Tip for scrollsawing multiple pieces

I build small boat models from thin (1/2 - 1/8" thick) basswood. When I try to scrollsaw several frames from basswood sheets held together with double-faced tape, the thin pieces break when I separate them. I've tried rubber cement to hold the layers together, but it tends to soak into the wood and causes problems with gluing and staining. Is there a better way to attach these layers of thin wood?


Bill, we asked Rick Hutcheson, our scrollsaw consultant, for an answer. Rick suggests you fasten the thin basswood together with nails or brads driven into the waste areas of the wood. Cut out the center sections of the frames first, leaving the material outside the boat frames fastened until the last cut. This way, when you're finished cutting, the frames are free from each other. Rick recommends using #18 or #19 brads to hold the sheets together. Drill pilot holes in solid woods to prevent the wood from splitting while driving these nails. Stack the layers on a steel surface, such as an anvil, and pound the nails completely through the stack, to peen the points of the nails.

Rack up the small pieces

I have a small woodcraft business, and I paint some of my products. Many times, I have to paint small pieces before assembling them. When I lay these pieces down on paper to dry, they often stick to the paper. Do you have an idea that would prevent this from happening?

—Joseph R. Levallee, Carrollton, Texas

Make a drying rack using a few finish nails and scrapwood. Drive three #4 finish nails through the scrap, close enough together so that they will support the painted wooden piece. Repeat this for each item you plan to paint. Set the craft piece on this rack, paint the edges and face, and allow to dry. Now, turn the piece over, paint the remaining face, and place the piece on the rack with the dry-face down. This will give you "paperless" painted pieces for your woodcrafts.

Drying Rack for Small Pieces

#4 finish nails

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This glue's no drip; it stains well and stands up to water
Traditional white or yellow woodworker's glue can drip and smear, refuse to take stains, and weaken when exposed to water. To solve all of these problems, Borden came up with a new formula called Weather-Tite Wood Glue.

The gel-like consistency of this glue prevents the inevitable squeeze-out from running down the face of your work. The excess glue beaded up neatly on the glue line, and that allowed me to focus on the work rather than on having to dash around for rags or wet cloths to mop up drips.

This new formula contains wood particles to help the dried glue absorb stains and finishes. On the boards I test-stained, the glue lines all but disappeared.

As to watertightness, I soaked a couple of my glue-ups for a day, and then tried to pry the boards apart. Despite my best efforts, the glue held fast. The water tightness makes this glue ideal for outdoor furniture projects that may get rained on, but I found the other benefits so handy that I plan to use it for all of my work.

—Tested by Bob McFarlin

Elmer's Weather-Tite Wood Glue, about $3 for an 8-oz bottle. Available at most hardware and home-center stores.

Pushstick performs seven different shop tasks
From the description on its package, this seven-function tool sounded like the Swiss Army knife of pushsticks. You can buy individual tools to perform each of these functions, but no one tool, until the Saw-Aid came along, combines them all.

I found the Saw-Aid most useful as a pushstick. The long front portion let me put pressure on the top of a board, eliminating the chatter you sometimes get with smaller pushsticks. The depth-gauge feature also came in handy. To accurately adjust the cutter height on your tablesaw or router table, simply crank the blade or bit up to the desired setting. The measurements step up in 1/6" increments from 1/6" to 1 1/2".

The sides of this tool serve as angle gauges for 30°, 60°, 45°, and 90° readings. The angles are too short for marking off long cuts, but they work great for checking the tilt of a blade or the fit of a box corner.

The center finder works fairly well too, but only takes stock up to 2 1/4" in diameter. My only complaint about this multi-purpose tool is that the thick white marks on the ruler left precise measuring a guess at best.

Despite appearances, the Saw-Aid is no toy. I found the accuracy of the depth gauge and all of the angles dead-on when I checked them against a machinist's square.

All in all, this tool offers enough practical applications to make it useful in any shop. Hang the Saw-Aid by your tablesaw or router table, and you'll use it more than you might think.

—Tested by Bob McFarlin


Continued on page 30
Here’s What Our Customers Say!

Forrest
You are the best!
Your blades are the best!
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Your sharpening of my (cheap) dado set made a new set.
It’s a pleasure to do business with you—(I have told this to all of my friends, colleagues and family.)

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Your WOODWORKER & CROSSCUT 1 1/2" ROCKHARD & SOFTWOODS
well polished finish which is not surpassed by any other manufacturer on the market.
The wood passes through the saw like a hot knife through butter: smooth and
and with little effort. I see a similar glide whether it is maple, oak, pine, or whether it
is thick or thin. Really fine stuff.
Your production staff can be proud of their work. The production quality is
not just good, or to specification, it is exceptional.
In retrospect, the minor difference in cost is well worth the final result.
Besides, it is the blade that produces the cut for a piece to outlast the maker.
Glad to make acquaintance with your staff and their work.

Respectfully yours,
David Hares, Esq.
Attorney, St. Louis, MO

(From Another Customer)
In closing I would like to add that the Woodworker II is by far the finest saw blade that I have ever used. I also have the Forrest dado set which is without a doubt, the king of all dado sets. I work exclusively with red oak and oak veneer plywood and the dado set performs splinter free cuts as advertised.

It is a pleasure to purchase a product that does what it is advertised to do.
Thanks for making such a fine product.

Sincerely,
Dennis R. Schleze
Owatonna, MN

Attention: Customer Relations  Re: Woodworker I & II Blades
Gentlemen:
I recently ordered and received Woodworker I & II saw blades for my radial and table saws. I used the blades received.
I originally avoided the blades because of the cost in comparison with other models on the market. I saw some chips missing in my old blades, and it was time to toss and replace with new blades. I sighed and ate the additional cost and purchased your blades and sharpeners.
I find your blades of the highest quality. They produce a velvet cut with a polished finish which is not surpassed by any other manufacturer on the market.
The wood passes through the saw like a hot knife through butter: smooth and
and with little effort. I see a similar glide whether it is maple, oak, pine, or whether it
is thick or thin. Really fine stuff.
Your production staff can be proud of their work. The production quality is
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Note: Fine Woodworking
Editorial Nov. Dec. 1988
No. 73, pg 65, S.N.
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For the purpose of my testing, I kept the transmitter in my pocket and pulled it out and clicked the dust collector on and off while working with various power tools. It worked no matter where I stood or how accurately I aimed it. Eliminating that hike to the dust collector saved a lot of time and ended a distracting hassle.

The only drawback I could think of is that the transmitter might get lost in the clutter on your benchtop—a problem you can easily solve by storing it in a safe, easy-to-find location.

—Tested by Chuck Hedlund

DCS-100 Starter Kit, (including transceiver module, relay mod-
ule, and hand-held RF transmitter) $92 ppd. (North Carolina resi-
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August West Backs You Up

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WOOD ANECDOTE

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Growing as a small deciduous tree in the big-timber regions of the Pacific Northwest, the cascara buckthorn (Rhamnus purshiana) contains a medicinal extract in its bark that’s a sure cure for one of mankind’s most common maladies. For over 100 years, cascara buckthorn has brought relief to those suffering from constipation. Although at 10’ to 40’ tall it’s dwarfed by Douglas fir and other commercial species, the cascara buckthorn draws a small army of “cascara barkers” deep into the shady woods every summer. Using nothing more than a sharp knife, itinerant workers from Northern California to British Columbia collect about one million pounds of bark. A typical Barker harvests 250 pounds in a day and collects $50 for the effort. When in doubt about the species, barkers simply taste a small sample of the bark for the bitter flavor and mouth-numbing effect that marks it as cascara. Local Indians first alerted the area’s Spanish missionaries to the beneficial effects of this bitter bark, which was thereafter dubbed cascara sagrada or “holy bark.” Yet, it wasn’t until 1877 that the Parke-Davis company began selling cascara extract to the rest of the country in an over-the-counter formula. By World War II, GIs weary and bloated with C-ration calls cascara-based medicine “CC pills.” Cascara wood varies from yellow to orange-brown in color. Although easy to machine and finish, it has little commercial value.

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Illustration: Jim Stevenson
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The construction sequence is as follows: Cut out the two end panels (A) and attach them to the end supports (B). Assemble the base (C, D, E, F,) and attach the end panels to that. Complete the rack by attaching the rails (G).

**Bill of Materials**

<table>
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<tr>
<th>Part</th>
<th>Finished Size</th>
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<tr>
<td>A end panels</td>
<td>11&quot; x 11½&quot; x 51&quot;</td>
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<td>B end supports</td>
<td>11½&quot; x 3½&quot; x 15½&quot;</td>
<td>2 x 4</td>
</tr>
<tr>
<td>C base</td>
<td>11½&quot; x 3½&quot; x 9½&quot;</td>
<td>2 x 4</td>
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<tr>
<td>D base</td>
<td>11½&quot; x 3½&quot; x 12½&quot;</td>
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<td>E base</td>
<td>3½&quot; x 5½&quot; x 9½&quot;</td>
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<td>F base</td>
<td>3½&quot; x 1½&quot; x 9½&quot;</td>
<td>P 1</td>
</tr>
<tr>
<td>G rails</td>
<td>3½&quot; x 3½&quot; x 9½&quot;</td>
<td>1 x 4</td>
</tr>
</tbody>
</table>

**Materials Key:** Plywood

**Supplies:** #8x2", #8x3½" wood screws, 2½" swivel casters, #12x¾" panhead sheet-metal screws.

---

**Project Design:** James R. Downing

**Photography:** Bill Hopkins, Jr.

**Illustrations:** Roxanne LeMoine
The Adventures of Dusty Pyles

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<th>DESCRIPTION (ALL 2 FLUTE)</th>
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At the foot of the Bighorn Mountains near the town of Sheridan, Wyoming, Bud Morrow builds custom guns for a living. In his crowded shop, the trophy heads of elk, deer, and Bighorn sheep look down on a jumble of files, chisels, bullet boxes, barrels, trigger assemblies, and rifle-stock blanks. Standing at a bench that has been seasoned with decades of iron filings and tung oil, Bud carefully and patiently builds anywhere from 30 to 50 new rifles a year. He also reconditions older rifles like pre-1964 Winchester Model 70s, and old military rifles. As a graduate of the country's oldest gunsmithing school at Trinidad State Junior College in Colorado, and after 35 years of building custom hunting rifles, Bud can rightfully stake his claim as one of the top gunsmiths in the country.

Legacy of the Old West
The Bighorn Mountains own a big chunk of American history. General George Custer met his fate just an hour's drive north from here. An hour to the south you'll find the site of the Hole in the Wall, made famous by Butch Cassidy and the Sundance Kid. A century after that wild and violent era, the guns are no longer shouldered by soldiers and outlaws, but by big-game hunters. To them the mountains of Wyoming are Mecca. And some of them, those who have the money and the passion for guns and hunting, come to the Sheridan Gun Shop to have Bud Morrow build them a one-of-a-kind rifle.

Continued
If it’s too pretty to use, I say “don’t buy it.” With a starting price around $3,000, custom rifles don’t come cheap, but Bud would much rather his customers use his rifles than to seal them up for show in a display cabinet.

“I build these guns for people to hunt with,” says Bud. “Just because something’s pretty doesn’t mean it can’t serve a purpose. If somebody says it’s too pretty to use, I say don’t buy it.”

So why then would a person pay thousands of dollars for a custom gun and then risk damaging it in the wilderness? “It’s a luxury for sure,” says Bud, “but it’s like the difference between a Cadillac and a Chevrolet. Both will get you down the road, but one feels a whole lot better than the other.”

**Stalking the perfect stock**
The process of fitting the gun to the buyer begins with the selection of wood. Leaning back against his workbench, Bud is talking about trees and the growing conditions that make good gunstocks. “Trees are a lot like people. They want to go through life without too much adversity. But the best wood comes from trees that have to overcome hardships—poor soil, tough climates, and strong winds. These conditions force a tree to grow slower, but that makes the wood better, denser, and more durable.”

English walnut *Juglans regia*, a strong, dense wood with fine pores, takes the top spot on most gunmaker’s lists. It’s sometimes called French walnut because most of it is grown in and exported from France. American black walnut *Juglans nigra*, much of which lives a pampered life on tree farms, lacks the density and swirling grain that Bud prefers. Bastogne walnut, a hybrid of the English and American trees, offers the strength of English walnut with a beautiful fiddleback grain pattern. On rare occasions, Bud will build a gun from maple, koa, or myrtle, but these are strictly special requests.

Bud’s favorite wood, however, is the English walnut harvested in the rugged, arid regions of Turkey and the Himalayan mountains. The wood from these slow-growing trees is a gunmaker’s dream—as dense as marble, unmatched in stability, and strikingly beautiful.

**Digging up the roots**
Finding good wood has never been easy. “Most of the pretty figure and grain comes into the tree close to the ground,” explains Bud. To cut a tree for gunstocks, the tree should be dug up out of the ground to get the roots. “Some cutters know what makes a

**Rifle stock blanks**

In his shop, Bud explains the ideas behind the clean lines and conservative design of a classically styled, 22-250 rifle he recently built.
good gunstock. The ones who don't, break my heart," says Bud, referring to the wood he's seen ruined by careless sawing. Out of 100 stock blanks, only two or three usually meet his requirements, and these command a hefty price, anywhere from $500 to $1,500. Bud buys most of his stocks from tree cutters, people who drive around the country peddling these premium pieces of wood to gunsmiths.

Once he has a stock blank in hand, Bud sets it aside to air-dry for three to five years. After the stock has seasoned, he'll take a few measurements to fit the gun to the customer, and discuss style preferences and other details. The basic proportions of most rifles are well established, but Bud may vary the length of the stock up to an inch or so to suit the size and shooting requirements of the customer.

The return of classic style
Gunmaking traditions offer two styles—the classic school and the California school. Bud pitched his tent in the classic camp long ago.

His guns have always cut a clean, conservative profile. The California school, with its embellished curves and diamond inlays ("gingerbread" according to Bud) flowered in the 1960s and '70s at the behest of its guru and champion Roy Weatherby. But like so many other trends, the classic school is back in favor.

Putting it all together
Once he's selected the wood, Bud will square the top of the stock and one side, and then rough out the shape on a bandsaw. The recesses for the metal parts are hogged out with a drill press or router and cleaned up with chisels and gouges.

Beyond the rough shape, however, carving a custom gunstock is pure sculpture carried out with rasps, files, chisels, drawknives, and spokeshaves. Plans and patterns don't exist. And Bud has enough of an artist's temperament to know not to force himself to shape a stock on a bad day. "I can't shape or sand if I'm not feeling right about it", says Bud. "I'll go camping or go out in the garden instead. It's a whole lot less expensive to chop down a few bean plants than it is to ruin a thousand-dollar piece of wood."

Where metal meets wood
The biggest woodworking challenge comes when it's time to marry the wood to the metal parts. Any looseness here will eventually destroy the stock as the explosive force of the bullets slam the metal back against the wood. The barrel, bolt action, trigger assembly, and magazine box must fit to tolerances that

Continued
measure in the thousandths of an inch. For the final fittings, Bud coats each metal part with a carbon-based substance called "inletting black," then drops them down into their recesses. The inletting black marks the high spots on the wood, which Bud pares away with a chisel in paper thin shavings, as shown on in the photo on page 39.

Once the metal parts fit, Bud starts sanding with 60-grit sandpaper to bring the top surfaces of the wood and metal perfectly flush, and then continues with finer grits of sandpaper for finishing. When he reaches 220 grit, Bud adds Danish oil or tung oil to the stock and sands that in to help fill the pores, working up to a 600-grit paper. On the last few sandings Bud often switches to Dem-Bart oil, a special low-gloss oil made just for gun stocks. Most oils are too shiny for his tastes, says Bud. "I like to see the wood, not the finish."

Having fit the metal into the wood, Bud brings the two flush with careful sanding.

CHECKERING
The tell-tale detail

A metal foil pattern shows Bud where to mark the border of his cuts.
Carving a field of diamonds

Just before the final coat of oil, Bud pulls out his checkering tools and cuts the very fine diamond-shaped patterns around the grip and forearm of the rifle. Checkering provides a slip-resistant surface on the stock, and it's also a good indicator of a high-quality wood and a skilled gunsmith. With their density and tight grain patterns, the better woods support a much smaller checkering pattern, up to 32 lines per inch as opposed to 20 lines per inch for softer woods. And carving these tiny diamonds freehand, using nothing more than a V-tool and a metal-foil pattern as a guide, requires rock-steady hands and unflinching concentration. Even the slightest slip could require days of painstaking repair work.

After he has completed the woodworking, Bud disassembles the metal pieces for bluing, a process that knocks the shine off the metal and protects it from rust. With the bluing completed, the gun is ready. The whole process, from the first discussions with the buyer to delivery of the finished product, can take eighteen months or more. The customers get awfully anxious to put their hands on the gun, especially near hunting season.

Bud himself gets mighty scarce once hunting season starts. At that point in the year you're not likely to find him in the shop. A better bet would be to look for him out in the mountains, miles from nowhere, crouched with a rifle behind a rock or a tree, looking for a big elk.

His life as a gunsmith

In the last ten years the interest in gunsmithing has grown, according to Bud, but only a handful of people make a living at building custom rifles. Most of the other gunsmiths around the country also hold down another job, or build rifles on the side as a retirement hobby.

Bud's single-minded devotion to his work won't ever make him rich, but it's still the only way to make a great rifle. And his lifelong pursuit of the perfect rifle has its own rewards—peace of mind, pride in work well done, and a shop where he can look out the window to a panoramic view of the mountains. At the top of his profession, Bud has developed the confidence to evaluate his work with an open mind. He's got the experience of nearly four decades with the enthusiasm of a beginner.

"I guess I've never been completely satisfied with any gun I've built," says Bud nonchalantly. That's probably what keeps me at it. "The day I can't learn something new is the day I'll hang up my tools and quit."
Design editor Jim Downing, who headed the shop-concept team, says, “Like a ‘now you see it, now you don’t’ magic trick, a woodworking shop appears in the garage after the vehicles move out. Fluorescent fixtures provide plenty of light, and the white paint on the ceiling and walls enhances it. Epoxy floor paint proves durable and resists grease. Electrical drop cords with twist-lock plugs supply power to machines. For air tools and vehicle care, there’s a compressor hose on a ceiling reel.”
Here it is, woodworkers—the sequel to our first IDEA SHOP, which appeared in the September 1992 issue of WOOD® magazine. Like its predecessor, our new workshop was more than a year in the making. The creative thought, skill, and energy put into it by the staff was truly impressive. Even some of our readers participated.

In the first IDEA SHOP, we learned what it took to turn a 14x28' space into a serious woodworking shop. And most of the planning evolved from the concept that everything was more or less permanent.

IDEA SHOP 2 offers a different twist. You see, we know that many home woodworkers have their shop in a garage (usually occupied by a vehicle or two). So we took a standard 24x24' double-car garage and designed the space to accommodate a nifty shop—and the family transportation. To accomplish this, our project team had to think mobility, double-duty, comfort, security, and cost. But in the end, one great similarity with our first effort stands out: bunches of terrific, easily adaptable ideas! In this and future issues, we'll share them with you in the form of plans and step-by-step building instructions.

Do you have the problem of too much woodworking stuff for too little garage space? Or space going to waste because you can't figure out how to organize all those tools and materials? No matter which situation you're in, you'll find help in IDEA SHOP 2™. You'll learn why mobility is a must in garage shops—and how to achieve it. We'll also share some easy ways to solve storage-space problems—and still make room for family vehicles.

Above: Security can be a problem in an unattached building. Through an open door, it's contents are on view. That's why IDEA SHOP 2 features lockable cabinets that conceal tools and supplies.
All the space you

To make IDEA SHOP 2™ comfortable to work in during cooler weather, we insulated the walls and ceiling. (There's also access to storage space above the ceiling via a pull-down ladder.) We then sheathed the walls with beaded plywood panels; the ceiling with drywall. Both were painted with a reflective white semi-gloss enamel. The floor received a tough coating of epoxy paint. For heating comfort, we installed two small, wall-mounted natural-gas furnaces (20,000 and 30,000 Btu) with sealed combustion chambers. Their positioning on one wall also conserves precious floor space. An open garage door and an exhaust fan supply cooling ventilation in the summer. A ceiling-mounted air-filtration unit cleans recirculated air in the winter.

The storage challenge

For storage units, we chose reasonably priced yet sturdy and hardworking wall and base cabinets available at home centers. Even though they're at the low end of the manufacturer's product line, the unfinished units feature dovetailed drawer fronts and maple-and-birch-plywood construction. And better still, they save valuable set-up time.

To help create a welcoming work environment, we sprayed the cabinet carcasses and doors of IDEA SHOP 2 with a bright red enamel; we coated the face frames with clear urethane.

Even with a 24'x24' space, there was still the challenge of fitting in all the woodworking equipment and necessary shop furniture. A WOOD® magazine reader shared with us a portable workbench design with fold-down wings that tucks neatly away between base cabinets to the right of the radial-arm saw. Next to it, there's another parking spot just for the tablesaw and its mobile base cabinet.
need, when you need it

To get flexibility for various projects, yet allow for traditional garage uses, we added commercially made mobile bases to the router, drill press, table saw, and scroll saw. The tablesaw, planer, sander, and scrollsaw have shop-built mobile bases. These all utilize a clever tool-mover system for easy machine parking—again, an idea furnished by yet another WOOD magazine reader (watch for it and other ideas in a future issue).

To top things off, we designed and built a special two-sided tool chest on casters. It holds an assortment of clamps on one side and hand and power tools on the other, and parks along one wall. When needed, it can be wheeled alongside the mobile workbench.

How to clear the air
Unlike the first IDEA SHOP, we couldn’t install a fixed dust-collection system to serve all possible work areas in this shop where flexibility is foremost. In IDEA SHOP 2, we opted for a shop-vacuum-based system with a fixed duct run between base and wall cabinets along the back wall. It has two countertop connections and directly serves the sander, radial-arm saw, drill press, and bandsaw. For dust collection to other machines, you roll out the vacuum and attach it.

Although IDEA SHOP 2 doesn’t have a defined spray-finishing area, we allowed for it. In the far right corner of the shop, above one of the heaters, we mounted a through-the-wall power ventilator (covered when not in use). Right next to the vent is an oil-less connection for compressed air, for the times when you need to spray. (There’s an oiled line for air tools on the ceiling-mounted reel in the center of the work area.)

A planning place
Along the wall to the left of the lathe, we created the perfect spot for design and reference work. As you can see in the photo right, its cabinet features storage for books, magazines, plans, and drawing utensils. Below the cabinet, a wall-hung drafting table lifts up to provide a work surface. A step stool that allows access to the upper reaches of the wall cabinets provides a seat for the drafting table.

To the left of the cabinet, we located the telephone—complete with intercom to the house and a flasher to signal incoming calls when the ringer is turned off. The first-aid kit and an ABC-rated fire extinguisher are hardly adjacent to the phone.

Above: Emergency numbers are posted near the telephone. The wall cabinet holds reference materials and plans. A fixture mounted beneath the cabinet sheds light on the countertop below.

A special thanks to Stew Hansen’s Dodge City, Council Bluffs, Iowa, for the 1994 Dodge Ram 1500 pickup truck shown on opening pages.

SHOP COMPONENTS

Air filtration
Model AC460 Air-Cleaning System
Penn State Industries
2850 Comly Rd., Philadelphia, PA 19154 800/377-7297

Cabinets
Great Northern Cabinetry
P.O. Box 207, Rib Lake, WI 54470 715/427-5255

Fire extinguisher
First Alert Model FE10 Garage and Workshop Fire Extinguisher
Manufactured by BRK Electronics, 780 McClure Rd., Aurora, IL 60504 800/323-9005 or 708/851-7330

First-aid kit
Zee Medical, 22 Corporate Park, Irving, TX 75034-5105 800/841-8417

Furnaces
Models ASV120RTN-T (20,000 Btu), ASV730RTN-T (30,000 Btu) Perfection Schwank, P.O. Box 749, Waynesboro, GA 30830 706/554-2102

Lighting
Four-tube 4’ fluorescent fixtures, no. 11233
Light Concepts Division of Lithonia Lighting, P.O. Box A, Conyers, GA 30098-0067 404/922-9000

Paint
Sherwin Williams (visit your local dealer)
Floor: Tile-Clade High Solids (two-part epoxy), gray
Walls and ceiling: Oil-base Interior Wall and Wood Primer; Super Paint Interior Semi-Gloss Latex Enamel
Cabinets: Ultra One-Stage paint and Ultra 7000 CC645 Urethane Clear Coat (automotive finishes)

Wall paneling
Ply-Bead 4x8’ beaded plywood panels
Georgia-Pacific, 133 Peachtree St. N.E., Atlanta, GA 30303 404/521-4000

Photographs: Wm. Hopkins Illustration: Kim Downing
A rock-solid workbench that's mobile? In the past, this project might have sounded a little far-fetched, but not any more. A while back, WOOD® magazine reader Erv Roberts shared with us his garage/shop workbench design. Wanting to keep his cars inside during Iowa's cold, snowy winters, Erv needed a workbench with wheels so he could push it out of the way when the time came to bring his cars inside. He also wanted a workbench with fold-down leaves, giving him the most efficient against-the-wall storage possible. When Erv’s hobby calls, his benchtop folds out to a full 36"x58".

Start with the base cabinet for a solid foundation
1 Cut the two base side panels (A) to the size listed in the Bill of Materials from 3/4" birch plywood.
2 Cut the base banding pieces (B, C) to size from 3/4" maple. Glue the banding pieces to the panels where shown on the Base Side Panel drawing on the opposite page. See our shop tip on page 12 for hints on banding edges. Sand the banding flush.
3 Using the same drawing for reference, mark the location of, and cut or rout 3/4" dadoes and grooves 1/4" deep into the mating inside surface of each plywood side panel.
4 Mark and cut a 3/4" taper on the bottom rear corner of each side panel. When assembling the base later, the tapers must be directly across from each other. The tapers allow the casters to come in contact with the floor without the corners of the side panels rubbing against the floor when moving the workbench.
5 Cut the shelves (D) and dividers (E, F) to size from ¾" plywood. Now, cut a pair of notches in the upper corners of the top divider (E) where shown on the Base Cabinet drawing.
6 Cut the banding strips (G), and band both ends of each shelf (D).
7 Glue and clamp the shelves and dividers between the side panels, checking for square.
8 Cut the toe kick (H) and cleats (I) to size. Drill mounting holes through the cleats, attach them, and then screw the toe kick in place so the outside face of the toe kick is recessed ¼" from the outside surface of banding pieces C and G.

Add the pull-out handles and casters
1 Cut the handles (J) to size. Joint or plane each to ⅛/8" thick. Transfer the full-sized Handle Pattern to one end of each handle blank. Cut the contoured ends to shape. Then, rout or sand ¾" round-overs along all edges.
2 Drill the ½" and ¾" holes in the handle where dimensioned on the Handle Pattern. Cut four ⅝" dowels to 1½" long and glue them into the holes. The dowels act as stops when the handles are pushed and pulled in and out of the cabinet.
3 Cut the handle retainer cleats (K, L) and retainers (M) to size. Glue and screw the bottom cleats (L) to the retainers (M).
4 Turn the base cabinet upside down, and position the rigid casters flush with the inside face of the side panels (A) and outside face of the shelf banding (G). Drill pilot holes and screw the casters in place.

Build the plywood top
1 From ¾" birch plywood, cut the benchtop center panels (N) and outer leaf panels (O) to the sizes listed in Bill of Materials plus ½" in length and width.
MOBILE WORKBENCH

Bottom of base cabinet

2 x 2" back flap hinges
(Stanley #814)

Mount hinges 3/4" in
from edge of cabinet

#8 x 1 1/4" F.H.
wood screws

7/8" hole, countersunk

7/8" pilot hole 1/2" deep

#8 x 1 F.H.
wood screw

1/2 x 3 1/2" lag screws

1/2" flat washer

Mount Receiving Blocks (1)
directly below legs

1/2" nut

1/2" flat washer

1/2 x 4 1/2" carriage bolts

FINAL ASSEMBLY
**Bill of Materials**

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size</th>
<th>Material</th>
<th>Qty</th>
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<tr>
<td>A sides</td>
<td>¾&quot; x 31½&quot; x 32½&quot;</td>
<td>BP</td>
<td>2</td>
</tr>
<tr>
<td>B blm. bands</td>
<td>¾&quot; x ¾&quot;</td>
<td>M</td>
<td>2</td>
</tr>
<tr>
<td>C side bands</td>
<td>¾&quot; x ¾&quot;</td>
<td>M</td>
<td>4</td>
</tr>
<tr>
<td>D shelves</td>
<td>¾&quot; x 12&quot; x 31½&quot;</td>
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<td>3</td>
</tr>
<tr>
<td>E divider</td>
<td>¾&quot; x 12&quot; x 8½&quot;</td>
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<td>1</td>
</tr>
<tr>
<td>F dividers</td>
<td>¾&quot; x 12&quot; x 9¼&quot;</td>
<td>BP</td>
<td>2</td>
</tr>
<tr>
<td>G shelf bands</td>
<td>¾&quot; x ¾&quot;</td>
<td>M</td>
<td>6</td>
</tr>
<tr>
<td>H toe kick</td>
<td>¾&quot; x 3¼&quot; x 11½&quot;</td>
<td>M</td>
<td>1</td>
</tr>
<tr>
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<td>¾&quot; x 1&quot; x ¾&quot;</td>
<td>M</td>
<td>2</td>
</tr>
<tr>
<td>J handles</td>
<td>¾&quot; x 2½&quot; x 32&quot;</td>
<td>M</td>
<td>2</td>
</tr>
<tr>
<td>K cleats</td>
<td>¾&quot; x 1&quot; x 32&quot;</td>
<td>M</td>
<td>2</td>
</tr>
<tr>
<td>L cleats</td>
<td>¾&quot; x ¼&quot; x 10&quot;</td>
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<td>2</td>
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<td>¾&quot; x 4&quot; x 10&quot;</td>
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<td>¾&quot; x 34½&quot; x 19½&quot;</td>
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<td>6</td>
</tr>
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<td>4</td>
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<td>M</td>
<td>8</td>
</tr>
<tr>
<td>T* legs</td>
<td>1½&quot; x 2½&quot; x 31½&quot;</td>
<td>LM</td>
<td>4</td>
</tr>
<tr>
<td>U rec. blocks</td>
<td>½&quot; x 2½&quot; x 3½&quot;</td>
<td>M</td>
<td>4</td>
</tr>
<tr>
<td>V spacer block</td>
<td>2½&quot; x 5&quot; x 5&quot;</td>
<td>LBP</td>
<td>1</td>
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<tr>
<td>W vise jaws</td>
<td>¾&quot; x 4&quot; x 9&quot;</td>
<td>M</td>
<td>2</td>
</tr>
<tr>
<td>X dogholder</td>
<td>1¼&quot; x 2½&quot; x 3½&quot;</td>
<td>LM</td>
<td>1</td>
</tr>
</tbody>
</table>

*Note: Initial cut parts marked with an * oversized. Then trim each to finished size according to the how-to instructions. Note, we measure length with the grain.

**Materials Key:**
- BP = birch plywood
- M = maple
- P = plywood
- LM = laminated maple
- LBP = laminated birch plywood

**Supplies:**
- #6 x ¾" flathead wood screws, 6-2¼" heavy duty hinges (Stanley #814 back flapper hinge), 2 sections of 1½" continuous hinge 36" long with #6 x ¾" flathead wood screws, ¾" dowel stock, 2-½ x 4½" carriage bolts with flat washers and nuts, 2-½ x 3½" lag screws with ½" washers, 2-½ x 3½" (3¼" overall height) rigid casters with #6-32 x 3" panhead sheet metal screws, 4-½" T-nuts, 4-½" nuts, 4 adjustable floor glides, clear finish, paint.

**Buying Guide**
- Vise: Record 52-120, 9" jaw width, 13" jaw opening, with quick-release mechanism. For the current price contact Seven Corners Hardware Inc., 216 W. 7 Street, St. Paul, MN 55102. Or call 800-328-0457 or 612-224-4869 to order.
MOBILE WORKBENCH

2 Glue and clamp the benchtop panels together in pairs with the edges and ends flush. See the Benchtop drawing for reference. (We used sliding-head type clamps around the perimeter. Then, we drilled and countersunk a few screw holes from the bottom side and added a few screws in the middle to pull the panels tightly together.)

3 Trim the laminated benchtop panels to the finished sizes listed in the Bill of Materials.

4 Rip to width and then miter-cut the banding strips (P, Q, R) to size. Drill countersunk mounting holes, and screw (no glue) them to the laminated benchtops.

The gate-leg assemblies come next

1 Using the dimensions in the Bill of Materials and on the Gate Leg drawing, cut the rails (S) to size.

2 To form the legs (T), cut eight pieces of 3/4" maple to 21/2" wide by 32" long. Glue four pairs of two pieces each face-to-face, with the edges and ends flush. After the glue dries, scrape it from one edge of each leg. Next, joint or plane that edge flat. Rip the opposite edge of each leg on your tablesaw for a 21/4" finished width. Crosscut both ends of each leg to a 31/4" finished length.

3 Using a dado blade in your tablesaw or radial-arm saw, cut a pair of 21/4" dadoes 3/4" deep where shown on the Gate Leg drawing.

4 Checking for square, glue and clamp a pair of rails (S) to each leg (T).

5 On the bottom of each leg, draw diagonals to find center. Drill a 7/16" hole 2" deep at each centerpoint. (We used a brad-point bit to prevent wander.)

6 Tap a ⅜" T-nut into the bottom of each leg, centered over the holes you just drilled. Pry the nuts loose. Mix about an ounce of epoxy, and use an ear swab to coat the portion of each leg bottom and hole that comes into contact with the T-nuts. Tap the T-nuts back into position. After the epoxy cures, thread a ⅜" adjustable floor glide into each T-nut.

7 For locking the leg tops to the bottom surface of the benchtop leaves later, cut the receiver blocks (U) to the size listed in the Bill of Materials and the shape shown on the Receiver Block drawing. Drill the mounting holes. Set the blocks aside for now; we'll add them later.

It's time to add the vise

1 Using the Final Assembly and Spacer Block drawings for reference, laminate three pieces of 3/4" plywood to form the spacer block (V). (We used a Record 52-1/2D woodworker's vise with a 9" jaw width. The size of your spacer and its location may vary with different brands of vises. See the Buying Guide at the end of the article for our vise source.)

2 Mark the centerpoints and bore ½" and ⅜" holes through the block where marked on the Spacer Block drawing. Cut from the edge in to the ⅜" holes to form ⅜"-wide slots where shown.

3 Clamp the spacer block (V) to the bottom side of the benchtop center section (N) where shown on the Final Assembly drawing. The outside edge of the block should be flush with the outside edge of the banding strip (Q).

4 Position the vise on the spacer block to determine the block's exact location, and adjust if necessary. With the vise clamped securely to the benchtop, use the existing holes as guides to drill mounting holes through your benchtop. (We clamped scrap stock to the top surface of our benchtop to prevent chip-out.) Flip the center benchtop section (minus the vise) over, and counterbore the mounting holes.

5 Cut a pair of wood jaws (W) to size, and attach them to the metal vise jaws.

6 Mark the dog-hole centerpoints on the center benchtop section—where shown on the Dog Hole Layout drawing accompanying the Benchtop drawing. Drill the holes.
MOBILE WORKBENCH

Final assembly
1 Position a pair of saw horses about 4' apart. Set a pair of 2×4s on the sawhorses and center the benchtop center section upside down on the 2×4s. Position the benchtop leaves next to the center section also upside down. Using two 36"-long sections of 1½" continuous (piano) hinge, drill pilot holes and screw the leaves to the center section.
2 Position the base (also upside down) on the bottom side of the benchtop center section where shown in the photo below, centering the base from side-to-side and end-to-end. Place the long cleats (K) on the inside of the side panels (A). See the Final Assembly drawing for reference. Next, clamp the cleats in place to the benchtop. Lift the base off the benchtop, and drive screws through the previously drilled holes in the cleats and into the bottom side of the benchtop.
3 Reposition the base on the benchtop. Drill and countersink mounting holes through the outside face of the base cabinet into the cleats (K). Next, screw the base to the benchtop cleats.
4 Drill the mounting holes and attach the hinges to the ends of the leg rails. Attach the hinge/leg assemblies to the outside face of the side panels. (For proper spacing between the top ends of the legs and the benchtop bottoms, we slipped a receiver block between the two.)
5 Swing the legs 90° from the base sides, and slide the receiver blocks (U) in place under the legs. Use a pencil to trace their location on the benchtop bottom surface. Swing the legs against the base, and screw the receiver blocks in place.
6 Position the handles (upside down) on the K cleats. Screw the handle retainer pieces (L, M) in place.
7 Remove all the hardware and remove the legs from the base and the benchtop assemblies from the base.
8 Cut the dog holder (X) to shape, and drill a pair of holes in it to house your dogs.
9 Sand all assemblies. Apply a clear finish (we used satin polyurethane) to the benchtops and legs. Prime and paint the base and dog holder.
10 Attach the benchtops, legs, and dog holder to the base. Position the handles, and screw the handle retainers (L, M) to the base where shown on the Base Cabinet drawing. Mount the vise and casters.

Produced by Marlen Kemmer
Project Design: Erv Roberts
Illustrations: Kim Downing
Photographs: Bill Hopkins
It's sad but true that the space beneath most tablesaws goes to waste. But that needn't be the case, as you can see here. Our cabinet stores a plentiful supply of saw-blades, router bits, and other woodworking gear on the sliding trays. Plus, the entire cabinet is easy to move around in your shop, thanks to a pair of casters. Just store it against the wall when the cutting is done.

Note: Our cabinet was made to fit a Ryobi BT3000 benchtop tablesaw. You might need to change the overall dimensions to fit your particular benchtop saw.

Start with the plywood panels and edging
1 Cut the sides (A, B) to the sizes listed in the Bill of Materials from ¾" birch plywood. Note that side A is ¾" shorter than side B to allow for clearance against the floor later after adding the casters.
2 Cut the back (C) and top and bottom (D) to size.
3 From the edge of ¾"-thick stock, rip the maple edging (E, F, G, H) to size plus 1" in length. Glue and clamp the edging to the edges of the plywood panels where shown on the Exploded View drawing. Later, trim the ends of the edging flush. See the shop tip on page 12 for our method of trimming the edges of the solid-stock edging flush with the surfaces of the plywood.
4 Mark the locations of the rabbets, grooves, and dadoes in the plywood panels (A, B, C), and cut or rout them to the sizes listed on the
TABLESAW BASE

Exploded View drawing. (We fit our tablesaw with a 3/4" dado blade and wooden auxiliary rip fence to cut the dadoes, rabbets, and grooves. Then, we test-cut scrap pieces first to verify a snug fit of the plywood pieces in the dadoes and grooves.)

Add the tray supports
1. From 1/4" hardboard, cut the tray supports (I, J) to size.
2. Position and screw the bottom supports (I) 1" above the bottom dado. Then, using a piece of 3/4"-thick stock as a spacer, position the remaining supports (I), drill screw-mounding holes, and screw the supports in place as shown in the photo above right. (Note that we placed a long piece of 3/4"-thick walnut in the bottom 3/4" dadoes to align the two side panels (A, B) before attaching the supports.)

Let the assembly begin
1. Dry-clamp the plywood panels (A, B, C, D) together to check the fit, and trim if necessary. Then, glue and clamp the pieces, checking for square. (To prevent unsightly glue stains on the plywood, we placed masking tape next to the glue joints before gluing. Later, after the glue dried, we peeled off the tape, taking the glue squeeze-out with it.)
2. Measure the length of the opening, and cut the toekick (K) to shape, tapering the corner where dimensioned on the Wheel detail accompanying the Exploded View drawing. Drill countersunk screw holes, and glue and screw the toekick in place.
3. Turn the assembled tablesaw base upside down, drill the mounting holes, and screw the 2 1/2" rigid casters in place.
4. Cut the border strips (L) to size. Drill the countersunk screw holes where shown on the Exploded View drawing. Screw the strips to the top of the cabinet.

Add the three trays for plenty of storage
1. From 3/4" maple, rip and crosscut the tray fronts (M, N) to size. From 3/4" plywood, cut the tray bottoms (O) to size.
2. Transfer the full-sized handle-cutout pattern below to poster board. Cut the poster board template to shape. Center the template on the front face of each tray front. Trace its outline onto each tray front, and cut the radius to shape to create the concave opening. Now, sand the tray fronts smooth.
3. Cut a 3/4" rabbet 3/8" deep along the bottom back edge of each tray front (M, N).
4. Cut a cleat (P) to size for each tray. Drill six countersunk holes in each cleat. With the bottom edge of the cleat flush with the top

Continued

FULL-SIZED HANDLE-CUTOUT TEMPLATE

Bill of Materials

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size</th>
<th>T</th>
<th>W</th>
<th>L</th>
<th>Mat.</th>
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<td>19 1/4&quot;</td>
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<td>19 1/4&quot;</td>
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<td>BP</td>
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</tr>
<tr>
<td>C back</td>
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<td>23 1/4&quot;</td>
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<td>3 1/4&quot;</td>
<td>18 1/4&quot;</td>
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<td>J supports</td>
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<td>5 1/4&quot;</td>
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<td>21 1/4&quot;</td>
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<td>3</td>
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<td>21 1/4&quot;</td>
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<td>1 1/4&quot;</td>
<td>2 1/4&quot;</td>
<td>3 1/4&quot;</td>
<td>M</td>
<td>2</td>
</tr>
</tbody>
</table>

Length measured with the grain.

Materials Key: BP-birch plywood, M-maple, HB-hardboard, F-fir.

Supplies: 8 x 3/4", 8 x 1 1/4", 8 x 1 1/2", 8 x 2 1/4", 8 x 2 1/4" flathead wood screws, 2-2 1/2" (overall length) screw eyes, 3/4" x 1 1/2" aluminum bar stock for locking bar, 2-2 1/2" rigid casters (3 1/4" overall height) with 8-8 x 3/8" panhead sheet-metal screws, 1/4" dowel stock, 1/4" dowel stock, primer, red enamel paint, clear finish.
TABLESAW BASE

dge of the rabbet, glue and screw the cleats to the tray fronts. Glue and screw a tray front/cleat assembly to each tray bottom (O), checking that the front is square to the tray bottom.
5 To make the router bit holders (Q), cut four pieces of 2x4 stock to 21\(\frac{3}{8}\)" long. Mark a centerline along both edges (not surfaces) of each piece of 2x4 stock. Starting 1\(\frac{3}{8}\)" from the ends and spacing the centerpoints 2" apart, mark centerpoints on the 2x4.
6 Drill \(\frac{3}{4}\)" and \(\frac{1}{2}\)" router-bit shank holes in the 2x4 stock. The number of \(\frac{3}{4}\)" holes vs. \(\frac{1}{2}\" holes will be determined by your bit collection. (After drilling into the wood, we wobbled the bit slightly to allow the bit shanks to be removed easily from the holes.)
7 Rout \(\frac{3}{4}\" round-overs along each edge of each piece of 2x4.
8 Using the Bit Holder detail on the opposite page for reference, angle the blade on your tablesaw, and rip each 2x4 section in two. Sand each holder (Q) smooth.
9 Locate and drill countersunk screw holes on the bottom side of each tray (O). Screw the bit holders to the top of each tray.
10 Use the Bottom Tray drawing to assemble the blade, shim, and dado-cutter holders.
11 Cut the drawer slides (R) to size, and glue and clamp them to the cabinet bottom (D), flush against the cabinet sides (A, B).

Consider a few add-ons
1 For hanging the miter-gauge extension on the side of the cabinet, twice transfer the miter-gauge extension holder full-sized pattern to \(\frac{3}{4}\"-thick stock. Cut the holders (S) to shape, drill a screw hole in each, and screw the holders to the side of the cabinet where shown on the Exploded View drawing.
2 For added security, drill pilot holes and add a pair of \(2\frac{1}{4}\)" screw eyes to the cabinet where shown on the Exploded View drawing. Then, crosscut a piece of \(\frac{3}{4}\"x1\" aluminum bar stock to 15" long for the locking bar (see the Locking Bar drawing below right for reference). Drill a \(\frac{5}{16}\" hole at each end to align with the screw-eye holes. Later, use padlocks to secure the locking bar to the screw eyes.

Sand it, paint it, and bring on the tablesaw
1 Remove the rigid casters and screw eyes, and finish-sand the entire cabinet.
2 Apply two coats of clear finish to the trays.
3 Apply a coat of primer to the cabinet. Later, apply two coats of red enamel paint to the cabinet. When the paint has dried, reattach the screw eyes and casters.
4 Position the tablesaw on the base, drill mounting holes, and secure with bolts.
TOP AND MIDDLE TRAYS

Drill and space holes as needed for router bits

5/8" hole, countersunk
Mating hole is a 7/64" pilot hole 1/2" deep

1/4" round-overs

3/4" rabbet 3/8" deep

1 3/4" 3" 3 1/2"

#8 x 1 1/4" F.H. wood screws

Center handle pattern on drawer front

Use 1/4 x 4"-dia. hardboard spacers placed between blades and chippers on 1/8" dowels

Note: Bottom tray is constructed same as top and middle trays

BOTTOM TRAY

1/8" dowel for dado blade storage

3/8" dowels for wrench storage

1/8" dowel for dado blade chipper storage

18 1/4" Dado shim set (plastic box is taped to tray)
ACCOMMODATING CABINETS

Perforated hardboard and hooks help you get organized once and for all

What's the #1 complaint most woodworkers have about their shop? You guessed it. They have a hard time finding the right tool when they need it most. If your shop could stand a little bit more order, try building the double-door cabinet shown here or the single-door unit on page 60. You can clean up your act in a hurry, which will leave you more time to do what you really want to do—build stuff.

Begin with the double-door cabinet and door frames

1. Using the Cutting Diagram for reference, lay out and cut the cabinet sides (A), cabinet top and bottom (B), door sides (C), and door top and bottom (D) to the sizes listed in the Bill of Materials. We used a stop when cutting the pieces to length to ensure that the height of the assembled doors would match that of the cabinet.

2. Set your tablesaw rip fence ¾" from the inside edge of the blade, and rip the edging strips (E, F, G, H) from the edge of ¾"-thick double-door cabinet.

<table>
<thead>
<tr>
<th>Part</th>
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<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
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<td>BP 2</td>
</tr>
<tr>
<td>B</td>
<td>¾&quot; 6¾&quot; 47¾&quot;</td>
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<td>C</td>
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<tr>
<td>D</td>
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<tr>
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<td>¾&quot; ¾&quot; 47¾&quot;</td>
<td>M 2</td>
</tr>
<tr>
<td>F</td>
<td>¾&quot; ¾&quot; 46&quot;</td>
<td>M 2</td>
</tr>
<tr>
<td>G</td>
<td>¾&quot; ¾&quot; 23¾&quot;</td>
<td>M 4</td>
</tr>
<tr>
<td>H</td>
<td>¾&quot; ¾&quot; 46&quot;</td>
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<td>M</td>
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<td>¾&quot; 22&quot; 46&quot;</td>
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<td>¾&quot; 1&quot; 48&quot;</td>
<td>M 4</td>
</tr>
<tr>
<td>P</td>
<td>¾&quot; 1&quot; 24&quot;</td>
<td>M 4</td>
</tr>
</tbody>
</table>

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Materials Key:

Supplies: 4d finish nails, #12 x ¾" panhead sheet metal screws, 3" deck screws, 2-1½" x 48" continuous hinge, 2-3" wire pulls, 2½" hasp, 2" barrel bolt, padlock, enamel paint, satin polyurethane.
maple. Crosscut the edging strips to length plus 1”. (We used the edging to hide the exposed plies of the plywood pieces.)

3 Glue and clamp the edging strips to the plywood pieces (A, B, C, D), and later trim the ends of the edging flush with that of the plywood. See the shop tip on page 12 for a method of trimming the edges of the edging flush.

4 As dimensioned on the Rabbet detail accompanying the Exploded View drawing, cut a 3/8” dado 3/8” deep 3/8” from the top and bottom ends of the cabinet and door sides A/F and C/H. Next, cut a 3/8” rabbet 3/8” deep along the ends of the top and bottom pieces B/E and D/G. (We test-cut scrap pieces of stock first to verify the settings.) Check the fit of the mating cabinet and door pieces.

5 Glue and clamp the cabinet assembly together, checking for square. Repeat the process to assemble the two doors.

Now, add the cleats and pegboard

1 Cut the cabinet and door cleats (I, J, K) to size from 3/4” pine.

2 Glue and nail the cleats to the inside of the cabinet and doors flush with the back edge of the plywood panels where shown on the Exploded View and Side Section View drawings.

3 Measure the openings and cut the cabinet pegboard (L) and door pegboard (M) panels to size.

Cut the door panels and banding to size

1 Cut the two plywood door panels (N) to size from 1/2” plywood.

2 Cut the door banding pieces (O, P) to size plus 1” in length from maple stock.

3 Rout a 1/8” chamfer along the front mating edges of the door panel (N) and banding (O, P). When joined together in the next step, the chamfers form a decorative V-groove. (See the Single Door Cabinet Exploded View drawing at right.)

4 Miter-cut the banding pieces (O, P) to length. Glue and clamp them to the door panels (N).

5 Lay the cabinet, front side facing up, on your workbench. Position the doors, front side (or panel side) up, on the cabinet with the edges and ends flush. To keep the hinges from binding later, lay a piece of folded writing paper between the cabinet and doors. The paper acts as a spacer to create the correct gap.

6 Use masking tape to secure the 11/2”x48” continuous (piano) hinges in place. Using the existing holes in the hinge as guides, drill 1/4” pilot holes into the cabinet and doors. Attach the hinges, and set the cabinet assembly upright, and open and close the doors to check the fit.

7 Locate and drill the holes, and attach a 3” wire pull to each door.

8 If locking the cabinet is a consideration, apply the barrel bolt, hasp, and hasp staple to the cabinet and doors.

Finishing touches

1 Remove the hardware from the assembled cabinet. Sand all the parts smooth.

2 Apply a clear finish (we used satin polyurethane) to the door banding O and P; see the intro photo for reference.

3 After the finish dries, mask off the edging, and apply primer to the rest of the surfaces. Later, paint the primed surfaces.

4 Fit the pegboard panels (L, M) in their respective openings. Use panhead sheet metal screws to secure the pegboard panels to the cabinet and doors.

5 Reattach the doors to the cabinet. With a helper, hang the cabinet on the wall, being sure to hit all available studs. Reattach the pulls, barrel bolt, and hasp.

How to build a single-door cabinet

Using the Single-Door Cabinet Bill of Materials, Exploded View drawings, Cutting Diagram, and the same construction procedure as used on the double-door cabinet, build the single-door unit.

### Bill of Materials

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size*</th>
<th>Matl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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<td>8”</td>
</tr>
<tr>
<td>B</td>
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<tr>
<td>C</td>
<td>3/4”</td>
<td>21/4”</td>
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<tr>
<td>D</td>
<td>1/4”</td>
<td>21/4”</td>
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<tr>
<td>E</td>
<td>1/4”</td>
<td>3/4”</td>
</tr>
<tr>
<td>F</td>
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<td>3/4”</td>
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<tr>
<td>G</td>
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<td>H</td>
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<tr>
<td>I</td>
<td>1/4”</td>
<td>28”</td>
</tr>
<tr>
<td>J</td>
<td>1/4”</td>
<td>1”</td>
</tr>
<tr>
<td>K</td>
<td>1/4”</td>
<td>1”</td>
</tr>
<tr>
<td>L</td>
<td>1/4”</td>
<td>281/4”</td>
</tr>
</tbody>
</table>

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.


Supplies: #4 finish nails, 3” deck screws, #12 x 3/4” panhead sheet metal screws, 11/2”x48” continuous (piano) hinge, 3” wire pull, 21/4” hasp, lock, enam- el paint, satin polyurethane.
What woodworkers need to know

If anything could be called a universal workshop storage system, it would have to be perforated hardboard panels. Inexpensive, readily available, and easy to work with, this material offers almost limitless possibilities for organizing and hanging tools on walls.

You'll find perforated hardboard in 4x8' sheets 1/8" and 1/4" thick at most lumberyards and home centers. Many dealers sell quarter panels or other precut sizes, too.

The 1/8"-thick board serves well for lightweight items, such as screwdrivers or other hand tools. But if you'll be hanging up heavy tools and accessories, such as power drills and dado sets, we recommend that you go for the 1/4" board. Choose tempered hardboard for toughness.

Put up the panels
When you hang perforated hardboard, space it out from the work-

Some copper wire and a rubber band will secure standard hooks to the board. You also can hold hooks in place with a dab of silicone adhesive or hotmelt glue.

shop wall about 1/2". We like to mount the panels on 1/4"-thick furring strips about 3/4" wide. Firmly attach horizontal furring strips to the wall for the top and bottom of the panel. Place two vertical strips for the panel's edges, and add a horizontal strip at the center. Fasten the furring strips into studs whenever possible.

Screw the panel to the furring strips with #8x1 1/4" roundhead wood screws or panhead sheetmetal screws. First, drive a screw through the hole at the top center of the panel, then place one about every foot along the top edge, pressing the board flat as you work toward the sides. Then, starting from the top corners, place screws about a foot apart down the sides. Fasten the panel to the center support and at the bottom edge in turn.

You can screw the panel right to open studs, too. If you do, install blocking between the studs at the top, center, and bottom of the panel for secure mounting. Fastened only at the sides, panels will bow and sag when loaded.

Get your things organized
To arrange the board for maximum usefulness, first gather the items you'll hang on it. Lay them out on the floor or on your workbench, organizing them for best space utilization and convenience. Plan to put the tools and accessories you use frequently within easiest reach. If it's too hard to hang tools up and get them down again, you'll probably just lay them down instead of putting them away. And that defeats the purpose of this entire exercise.

You'll find both straight and curved hooks in several different sizes. Most are made to fit both 1/4" and 3/8" perforated hardboard.

Handsaws, hammers, long straightedges, and similar items can hang from hooks high on the board yet remain easy to reach. Conversely, chisels, screwdrivers, and the like need to be low on the board so you can lift them from their holders. Just decide generally where you want to put items at this point—you don't need a detailed plan. After all, that's one of the advantages of using perforated hardboard and hooks—you can rearrange things on a whim.

Hang it all on hooks
Now, collect an assortment of hooks and fixtures, and start hang-
MAKING THINGS EASY. You'll find standard pegboard hooks like the ones shown below and left at most hardware stores, lumberyards, and home centers. Plastic bins and jars that hang on pegboard allow you to organize small parts and hardware easily. If you can't find them locally, one mail-order source is Leichtung Workshops (800/321-6840 for catalog).

An annoyance goes along with using perforated board and hooks. Sometimes, when you grab a tool from your neatly organized board, the hook comes off along with it. Hooks with locating tabs are less likely to pop off the board, but will still do so.

You can secure hooks to the board with retainers that clip over the hook and lock into adjoining holes. Look for them at hardware stores or in mail-order catalogs, such as Leichtung. (You also can bend #12 wire into Shooks, place one on each side of a hook, then stretch a rubber band between them, shown opposite page bottom.)

Power Peg hooks, sold by Sears, offer another solution to the fall-out nuisance. These plastic hooks, shown right, feature a ball-shaped tab that snaps into the hole in the board, making them more likely to stay in place.

For hooks that will absolutely never fall off (barring major abuse, of course), look to Forever Peg Hooks from Windsor Industries (800/678-2552). These fixtures (50 styles available) attach to the panel with screws, as shown below right.

Fixtures like these hold items that won't hang readily from a hook. Install a shelf on your perforated panel using two or more of the long, braced hooks for brackets. Drill holes on the shelf's bottom near the front edge to fit over the hook end.

Photographs: Wm. Hopkins Photography
Illustration: Brian Jensen
HOT CHOICES IN HEATERS
SAY GOODBYE TO WORKSHOP CHILLS

One of the first questions we asked ourselves while planning IDEA SHOP 2™ was “How should we heat it?” After doing plenty of research, we came up with a safe, efficient, and affordable system. Here, we’ll tell you about the option we settled on, as well as what we found out about some other heating alternatives.

If you’ve done any woodworking in the cold, then you know that low temperatures can put a chill on your fun. Of course, you can dress for the cold, but all that extra clothing can be unsafe if it restricts your movement or comes near whirling blades, pulleys, belts, and such.

In this article, we’ll explore some of the most practical options for heating a woodworking shop, such as gas furnaces and electric heaters. And although we don’t recommend wood-burning stoves, we’ll share with you the insights of a woodworker who wouldn’t give up his stove for all of the oil in the Persian Gulf.

To get to the bottom of this issue, we consulted with experts in the heating field, sifted through stacks of fire codes, and drew on the experiences of our own staff members. We also spoke with woodworkers who use portable kerosene-, oil-, or propane-fired heaters (including “infrared” heaters) that vent burned gases directly into the shop environment. However, we advise against using these unvented appliances in an enclosed shop. Why? The exhaust fumes contain carbon monoxide and other combustion byproducts that can build to levels that are hazardous to your health.

Note: Although we have no objection to equipment-intensive or environmentally friendly systems such as heat pumps and solar-heating units, we won’t cover them in this article. Instead, we’ll concentrate on commonly available and affordable systems that make sense for most any geographical region.

Gas furnaces: The way to go if your budget allows it
A new gas furnace will set you back at least several hundred bucks, but there’s no heating source that matches the safety, effectiveness, or convenience of gas systems. However, you may be able save a good deal of money by picking up a used unit. Just be sure to have it inspected by a heating professional.

When selecting a gas-fired appliance, consider how you will keep the air in your shop from entering the furnace’s combustion chamber. Why? Workshop air at times contains fine wood dust or volatile fumes from oil-based finishing and refinishing products that could ignite when exposed to a flame. In a garage shop, fumes from a leaking automobile gas tank or gas can also could ignite.

To achieve this separation of shop air and combustion air, you can either keep the furnace in an area sealed off from your shop, or buy a so-called “direct-vent” furnace with a sealed combustion chamber. Direct-vent units draw combustion air from the outdoors via a wall vent. To illustrate how these options compare, we’ll take a look at two such systems in WOOD* magazine’s original IDEA SHOP™ (described in the September 1992 issue) and IDEA SHOP 2™.

• IDEA SHOP 1: Keeping the furnace out of the shop
IDEA SHOP 1 is housed in a 14x28' insulated room partitioned from an uninsulated storage space under the same roof. In this case,
it made sense to locate a gas furnace in the uninsulated space, away from the dust and fumes of the shop. As you can see in the drawing below, a direct-vent gas heater mounts on a wall and uses outside air for combustion. These units install quickly because you need only cut a single hole in the wall, place the vent through the hole, and hang the heater on the wall. With our gas-supply lines already in place, it took two of us about three hours to install two Perfection-Schwank heaters.

**IDEA SHOP 2: The advantages of direct-vent, wall-mounted heaters**

If you need to place your heat source within the workshop, as we did with Idea Shop 2, here's...
heaters such as the one shown in the photo above.

The vent assembly, a key component of this system, consists of a tube inside a tube. The innermost tube channels exhaust air outside, and fresh air enters the combustion chamber through space surrounding the inner tube.

Although these units don’t heat a space as quickly as a forced-air furnace, keep in mind that they produce heat even during power outages. (We included optional blowers on our heaters, but found that the units heat quite well without these accessories.)

Electric heaters: OK for certain situations
There’s no denying the advantages of portable electric heaters. You can buy them for as little as $20, there’s no installation to speak of, and they don’t pollute your shop environment. However, several major disadvantages make them a poor long-term option for most shops.

WOOD magazine’s Managing Editor, Jim Harrold (working on a mantel clock in the photo below), has used electric heaters in his garage shop for several years. Now, he’s anxious to convert to a gas furnace. As Jim says: “Even a small electric space heater consumes lots of electricity, and I’ve blown circuits more times than I care to remember.”

Jim also has noticed a big jump in his electric bills in months when he has his electric heaters going. That’s not surprising since, for most parts of the country, it costs more to generate heat with electricity than with any other source. (According to statistics from the United States Department of Energy and the American Gas Association, a conventional gas heater, with 78 percent efficiency, costs less than one-third as much to run as an electric heater.) Nevertheless, portable electric heaters do make sense under certain conditions. If you have a small shop, or live in a warm climate, these appliances provide an economical means of taking the chill out of the air. Just remember to put them on a circuit separate from your tools and lights. As with gas furnaces, you must keep dust from accumulating on the surfaces of an electric heater. For safety’s sake, Jim Harrold also unplugs his electric heaters after he’s through working in his shop.

As Managing Editor Jim Harrold has discovered, portable electric heaters, although inexpensive to buy, provide little heat at a high operating cost.
What the fire codes have to say about shop heating

Although the standards put forth by the National Fire Protection Association (NFPA) don't apply to small-scale woodworking shops, we think it makes sense to pay attention to these guidelines when planning a home workshop, too. Here are some key points to consider:

- These standards prohibit the use of heating devices that employ an open flame. So, that rules out most wood-burning stoves, except for air-tight models that draw combustion air from the outside.
- The NFPA also spells out standards for collecting wood dust from surfaces and the air. Because of the flammability of wood dust, it makes sense to regularly clean it up, paying special attention to surfaces and on and surrounding heating appliances. To control airborne dust, you should have an effective means of venting it outside in the summer and filtering it in the winter. You can use compressed air to clean hard-to-reach areas, provided you do it on a regular basis to prevent putting heavy concentrations of suspended dust into the air.
- When purchasing a heating system, keep in mind that the NFPA standards require that these appliances be listed by the American Gas Association or another recognized testing agency. The heating element or combustion chamber should be permanently guarded to prevent accidental contact by people, material, or equipment.
- In a garage workshop with automobiles, you should protect heating appliances from moving vehicles. That means either situating the heaters where they will not be struck, or placing sturdy steel posts (capable of stopping a rolling car) as protection around them.

What about wood-burning stoves?

Although fire codes discourage the use of most wood-burning stoves in woodworking shops, many woodworkers swear by this time-tested heating source. Since you may already have a woodburning stove, or plan to buy one, we'll share with you the experiences of Don Mostrom, WOOD magazine's correspondence writer and an avid log burner.

Like most owners of a woodburning stove, Don likes the ambience of his stove, and the low cost of operating it (since he harvests his own wood). "I can still recall a frigid winter day a few years ago," Don told us, "I just got the stove cooking good, and the shop was nice and cozy. The only sounds in the air came from the crackling embers and the steady raspings of my handsaw as I cut some dovetails. It was utterly peaceful, and when I looked up, I saw that snow had started softly falling outside. On days like those, I forget all about the hustle and bustle of living in the 20th century."

Despite their charm, Don admits that woodstoves do have certain drawbacks. "Fueling a woodstove requires a lot of labor. You have to cut, stack, and chop the wood. Then, you have to put it into the stove and clean out the ashes from time to time. Also, there's no way to keep the fire going while you're out of town, so you have to either have a backup heating system, or remove anything from your shop that may freeze."

Although modern wood-burning stoves with catalytic combustors are much more efficient than older versions, they still dump a fair amount of pollution into the outside air. Remember, too, that new, good-quality woodstoves cost $500 to $2,000. And, some pollution-prone areas restrict their use altogether.

If you still have your heart set on a woodstove, Don offers this advice for your consideration:

- Clean the dust regularly from the woodstove, and maintain at least 3' of clear area around it.
- Never feed wood dust into the stove—you risk explosion.
- Be certain your chimney or flue meets local building codes, and clean it regularly.
- Restrict your finishing tasks to doing no more than a single furniture piece at one time, and do this away from the stove. If I were going to do a lot of lacquer spraying, I would get a spray booth.

"Before you buy a woodstove, check with the carrier of your homeowner's insurance. A woodstove may affect your coverage or premium. Some insurance companies issue guidelines for safe use of a woodstove." ✪

Written by Bill Krier
Illustrations: Kim Downing
Photographs: William M. Hopkins
We relied on Stanley for nearly all of our hand tools, especially items from the company's new Contractor Grade line. Power tools shown here in our mobile tool cart include the Hitachi D 10DF2 cordless drill, Black & Decker Quantum models BD1000 electric drill and BD6-200 plunge router, and Bosch model 1290D 1/2-sheer finishing sander.

Besides good organization, a solid workbench, and effective systems for such things as heating and dust collection, a properly outfitted workshop needs quality tools. To help you out, here's a listing of the tools we handpicked for IDEA SHOP 2™.

We thought long and hard before making our selections, and based them on our own hands-on experience. Rather than simply choosing the best or most expensive models available, we picked tools that work well but don't cost an arm and a leg. In short, we would buy these tools for our own workshops.

STATIONARY AND BENCHTOP MACHINERY

**Bandsaw, jointer, and thickness planer:**
Models 28-245 14" bandsaw, 37-190 6" jointer, and 22-540 12" portable planer
*Delta*
246 Alpha Drive
Pittsburgh, PA 15238
800/438-2486 or 412/963-2400

**Belt/disc sander and bench grinder:**
Skil models 3370 4x36" belt and 6" disc sander and 3396 6" bench grinder
*S-B Power Tool Co.*
4300 West Peterson Ave.
Chicago, IL 60646
312/286-7330

**Compressor:**
Model VT6196
*Campbell Hausfeld*
100 Production Drive
Harrison, OH 45030
800/543-8622

**Drill press:**
Model G1200
*Grizzly*
P.O. Box 2069
Bellingham, WA 98227
800/523-4777 (east of Mississippi)
800/541-5537 (west of Mississippi)

**Lathe:**
Model JWL-1236
*Jet*
P.O. Box 1349
Auburn, WA 98071-1349
800/274-6848
206/351-6000

**Oscillating spindle sander and tablesaw:**
Models OSS450 and BT3000
*Ryobi*
5201 Pearman Dairy Road
Anderson, SC 29625
800/525-2579

**Radial-arm saw:**
*Sears Craftsman Model 19632*
Call or visit your local Sears store.

**Scrollsaw:**
Model 1671
*Dremel*
4915 21st St.
Racine, WI 53406-9969
414/554-1390
PORTABLE POWER TOOLS

Air-powered tools:
Models DH6500 spray gun, MP2847 17-piece accessory kit including blow gun, tire gauge, and tire chuck, TL1016 straight-line sander, PL1501 ⅛" air ratchet, NBO03000 brad nailer, SN258KOO finishing stapler, and PA2078 filter/regulator/lubricator

Campbell Hausfeld
100 Production Drive
Harrison, OH 45030
800/543-6622

Belt sander and fixed-base router:
Models DW431 and DW610
DeWalt
626 Hanover Pike
P.O. Box 158
Hampstead, MD 21074
800/433-9258

Circum saw:
Skil model 5657
S-B Power Tool Co.
4300 West Peterson Ave.
Chicago, IL 60646
312/286-7330

Cordless drill:
Model D 10DF2
Hitachi
3850 Steve Reynolds Blvd.
Norcross, GA 30093
404/925-1774

⅛" electric drill, heat gun, and 1 ⅛-hp plunge router:
Quantum models BD1000, BD8300, and BD6200
Black & Decker
626 Hanover Pike
Hampstead, MD 21074
800/762-6672
410/239-6000

Skil model 5657 portable circum saw by S-B Tool Co.

Sears Craftman wrench sets

Snips, hex-key sets, and Vise-Grip locking pliers by American Tool Co.

Hitachi model D 10DF2 9.6-volt cordless drill

Square-drive screws from McFeely's

Sears model 11602 ¼-sheet finishing sander

Sandpaper from 3M

Bosch model 3283DVS random-orbit sander

Finishing products from Minwax

Bostik lubricants

¼-sheet finishing sander:
Sears Craftsman Model 11602
Call or visit your local Sears store.

¼-sheet finishing sander, jigsaw, and random-orbit sander:
Bosch models 1290D, B4200, and 3283 DVS
S-B Power Tool Co.
4300 West Peterson Ave.
Chicago, IL 60646
312/286-7330

Shop vacuum:
Quiet Super Power (QSP) model 900-84
Shop-Vac
2323 Reach Rd.
Williamsport, PA 17701-0307
717/326-0502

POWER-TOOL ACCESSORIES

Abrasive belts, sheets, and hand-sanding blocks:
3M
Consumer Relations, 3M DIY Division
3M Center, 515-3N-02
St. Paul, MN 55144
(phone number not available)

Bench dogs, dado shims, and snug-plug cutters:
Veritas Tools
12 East River St.
Ogdensburg, NY 13669
613/596-0350

Brad-point bits, Forstner bits, tapered countersink bits, router pad, and circle cutter:
Grizzly
P.O. Box 2069
Bellingham, WA 98227
800/523-4777 (east of Mississippi)
800/531-6537 (west of Mississippi)

Bullet brand twist drill bits:
Black & Decker
626 Hanover Pike
Hampstead, MD 21074
800/762-6672
410/239-6000

Dado-blade set, router bits, and saw blades:
Freud
P.O. Box 7187
High Point, NC 27264
910/434-8300

Dust-collection system:
Sears whole-shop dust-collection system, no. 29964
Call or visit your local Sears store.

Mobile bases for jointer and bandsaw:
HTC Products
P.O. Box 839
Royal Oak, MI 48066
800/624-2027
810/399-6180

Compass and trammel points from McFeely's

Continued on page 93
In the 10 years since WOOD magazine emerged on the woodworking scene, I've had the pleasure of meeting and writing about some swell woodworking craftsmen and women. Many of them have become good friends, even though I seldom see them. But from time to time I think about all the people I've met. So for this anniversary issue, I thought I'd check in by telephone with some of those people from the past, just to see what they have been up to.

—Peter J. Stephano, Sr. Editor

STEVE BALDWIN, TOYMAKER
Issue 2, Nov./Dec. 1984

"Who's going to pay $130 for one of these toys until they understand it? That becomes my job. I'm selling them one at a time over 30 years, rather than 3,000 every year. I'm building a following."

Ten years ago, Steve was running his Baldwin Toy Company out of a basement shop in his Omaha home. He would spend hours there when he was free from his high school counseling duties. Then, he'd sell his work at a few art fairs around the Midwest. Today, a lot has changed, but some things remain the same.

"I now have a detached 30×30' shop building on a two-acre lot—my basement shop was 10×15'—and can make all the sawdust that I want to," said Steve from his office at Omaha's Ralston High School. He's been a vocational counselor there for 25 years.

"I remember when a WOOD magazine staff member spent the weekend photographing my work and interviewing me for that early issue. I can say that I still use that article regularly to showcase my work. And yes, I'm still making the wooden toys, but I have a full-blown catalog now, with prices."

Steve mentioned that he had recently launched a plan business, too, and got over 1,000 responses from his first advertisement. "I was surprised by the demand for the plans of the more complicated, hard-to-build models," Steve noted. "Surprisingly, a lot of them came from Canada."

The veteran toymaker hasn't forgotten where his bread and butter is, though. "I still produce the Collector's Series of signed and numbered vehicles that I did then. But when that article appeared, I had only made about 100 of the Model A with the rumble seat. Now we're over 900. The series itself has grown to about 30 different models. The General, the train shown in the article (see photo below), well, I've sold 26 of those, starting at $3,000."

So what else has happened? "My wife and I now do seven to 10 major shows a year," Steve explained. "That's our main form of marketing. Of course, a lot of our business is return sales, because I haven't let up on the quality."
FAMILY REUNION
UP A FEW FRIENDS

JUDY GALE ROBERTS,
INTARSIA ARTIST
Issue 24, August 1988
"I choose red cedar for my
intarsia because of its varying
color and because it doesn't deteriorate. One hundred
years from now, a person could sand and refinish
one of my pieces and the wood will look as
warm and colorful as it does today."

"In 1988 we relied primarily on art fairs, and a few commissions, to sell
my intarsia," Judy replied to the question about how life had changed. "But when we
had 5,000 pattern requests from that article in WOOD, our little
Lufkin, Texas, operation turned more into a business. We realized
that there really was a market for the patterns that I design. So, we
bought a computer to track the names, then started a newsletter. Now, all of my
work involves the designing of patterns for intarsia and scrollsawing."

According to Judy and husband Jerry, their pattern customers write to their Texas headquarters
from all over the U.S., as well as Australia, Aruba, New Zealand, England, Germany, the Bahamas,
Mexico, Hawaii, Japan, and Brazil. Creating 18 new intarsia patterns per year, and three books of
scrollsaw patterns with 35 new ones in each, limits Judy's shop time. "I know
when to say 'Uncle' if I run out of ideas," said Judy, "but instead, we keep
coming up with new ones. We run out of time more often than ideas—I guess because this business is so exciting. About the only time I
go into the shop now is to do the models for the patterns. Yet, when I do spend time there, it's a lot
more enjoyable."

What about the old days? "I do miss the art fairs and the camaraderie between the artists," admitted Judy,
"but not the packing and unpacking. I guess back then I was hoping to become a famous
intarsia artist. Now, we're just aiming at the same goal from a different direction. At some point,
I'd just like to go back in the shop and create the art—and not worry about selling it. That's
every artist's dream."

Continued
ROBERT ST. PIERRE, WOOD SCULPTOR

Issue 5, JUNE 1985

“The exciting part of my work is going from one piece or project to another, learning from each. You develop a feel for the wood, a knowledge of how it behaves. Each reacts differently to laminating, sanding, and the finishing.”

“A lot has happened in those years, but that article in the magazine was probably the most central thing concerning the success of my work. I have gotten so much feedback from it. It was the exposure, whether the readers were woodworkers or not. And the magazine seems to never die—I still get response,” Bob told me from his new home in the Tusquitee Mountains near Hayesville, North Carolina. He and his wife Mary moved there in July 1993 to get away from the hustle, bustle, and cost of Boston.

“Living here is like being in a bank vault, but instead of gold bars all around, I have trees! And that’s new to me,” Bob exclaimed. He has always appreciated the varying colors and grain of wood. And he integrates its unique visual qualities into his work that’s made up of rings cut with a jigsaw, which he laminates into bowls and other vessels or glues into sculptures. Like a kid in a candy store, he’s now overwhelmed by the stock on the stump that circles him. “We’re surrounded by forests. For $50 I can buy a walnut tree 30” in diameter at the base and tall enough to get three 8’ logs!”

On his acreage, Bob has a new 60x80’ shop, with a view. “Through the windows, I see the sun coming over the mountains, and watch wild turkeys and eagles,” he said. “I was looking for a place where it was easier to live, because with my work, I can live anywhere. And I found exactly the right place.”

And what is Bob’s work like these days? “Over the long run, my work has changed dramatically, although the technique remains the same,” he explained. Bob’s creations also have spread from New England to around the

Perhaps you’d like to turn your woodworking into a successful career just like our featured professionals did? If so, their stories require some “reading between the lines.” Such as:

- Select some good designs, perfect them, and make them the bread-and-butter basis of your work. Steve Baldwin has done that with his Collector’s Series.
- Build on success by adding products that tap new markets, just as Robert St. Pierre has done with his expanded line of vessels.
- Take advantage of new opportunities with your talent. Judy Gail Roberts achieved more fame and fortune with designs than actual woodworking.
- Build a solid reputation. Had not Destree Hajney tested her abilities through carving competitions, she might not be one of the nation’s foremost wildlife carvers.

A WOOD® MAGAZINE

Until this issue, Chuck Heiken, an antique furniture restorer, has never appeared on these pages. But his is a great story, nonetheless. For 23 years, Chuck was in data processing at a large Des Moines-based insurance company. But in 1992 things were changing, and he felt uncomfortable.

“I was getting burned out. My responsibilities were getting further and further removed from
globe, with pieces in 34 countries, including the U.S. embassies in Honduras and South Africa. As Bob sees it, he reached some marketing milestones, too.

“Most of my sales come from three big wholesale shows a year,” he noted. “In fact, from the last show a buyer from the chain of Liz Claiborne shops called me to order some display pieces for the stores. Awhile back, I developed a line of wooden cremation urns with screw-on lids that are marketed to funeral directors across the nation. Of course, I still do commission work with my sculptures and vessels—I’ve had one for an 8’ tall vessel that paid $12,000. Then, I do a line of floral bowls and vases with glass liners intended to hold fresh-cut flowers.”

And what has Bob learned in the last decade? “I’ve found out that anything is possible. If you believe in something, and want to work hard, success will be there, it will come” he said. “But enjoy what you do, too, and have fun doing it. You can’t, though, become successful by only working 8-5. My typical day is 8 a.m. to 10 p.m., seven days a week, and it’s been like that since 1984. Still, I love wood, I love form, and I have a great time.”

DESIREE HAJNEY, WILDLIFE CARVER
Issue 29, JUNE 1989
“Carving never gets old. One reason is all the things I still want to carve. Another is that I challenge myself. For some reason, a woman gets criticized more than a man, so I’m more careful with details.”

Over forty issues of WOOD magazine have been published since we introduced Desiree Hajney. She, husband Bernie, and son Jeff lived in Colunbus, Nebraska, then. Today, they make their home in Wichita, Kansas. But more than her location has changed.

“More doors have opened here, and so many carvers come through town—I’ve just learned so much,” Desiree bubbled. “I just finished a book on carving, we issued a video, and I’m a regular contributor to an English carving magazine! Now, a really big thing has happened: A company called Conversation Concepts has bought six of my designs for reproduction. They make them and then sell them to gift shops around the world! The pieces will be signed and have a little brochure with them about me and my work.”

Desiree, who has been carving and regularly accumulating blue ribbons from national and international carving competitions since 1985, places more career emphasis on teaching now. “I’ve slowed down around the show circuit,” she said. “But I will be teaching at least a dozen seminars across the U.S. this year. And I have bookings for 1995.”

Not surprising, Desiree’s instructions for carving Roscoe the Raccoon in the issue that interviewed her prompted readers to order over 2,000 carving blanks of the figure so that they could have one, too!

So what is different today? “I’m doing better than I expected. But for a long time I didn’t know what to expect—we just went with the flow. These days, Bernie and I are planning two years ahead, and in the near future he’ll quit his teaching job to work with me full-time. Our son Jeff has even taken an interest in art. How much better can it get.

READER TAKES THE PLUNGE
the technical, and I needed something different,” says Chuck. “I spent about a year looking for something else. Then I read the article about the wood-finishing program at Dakota County Technical College (“WOOD® Magazine Goes To Finishing School,” Issue 49, January 1992), and my wife Sharyl and I went there for a visit. I liked what I saw there and decided to attend.”

Chuck enrolled in the 10½-month program and graduated. In October 1993, he bought an existing refinishing business with savings. “The school was very realistic when it came to what we could expect in the world.

Because I had done woodworking as a hobby, I had more or less decided on antique restoration before I went there, and placed my emphasis on that. Right now, as Heritage Restorations, I’m located in an antique-oriented business area here in Valley Junction [West Des Moines, Iowa] and keeping myself and my helper, Chad, very busy. And I’m happy again.”

Photographs: David Jordan, Jim Rider, Phil Hawks, Hopkins Associates, Peter J. Stephano
The Statue of Liberty, our flag, and what they stand for—it’s all in this spectacular design from Maryland woodcarver Robert Thomas. And, once you start carving, you’ll pledge allegiance to the straightforward techniques used to make this impressive relief plaque.

**Glossary:**

**Grounding:** Removing wood to establish the relief levels before detailing a carving. Start with the deepest relief area in the design when grounding.

**Stop cut:** An incision along a pattern line. A stop cut enables you to carve toward that line using a knife or gouge without chipping out wood beyond the line. This way, you can establish sharp edges and separations in your carving.

**Sweep:** The side-to-side curvature of a gouge, designated by a number from 1 to 11. The degree of curvature increases with higher numbers. No. 1 denotes a straight blade; no. 9.

Draw a pencil line across the front surface of a 1x5 3/4x12" basswood carving block, 2" from the top end. Lay a photocopy of the full-sized Miss Liberty pattern opposite page on the wood, placing the top of the pattern on the pencil line. Tape the pattern to the wood at the top, and slide a piece of transfer paper under it. Then, trace the pattern onto the wood.

After removing the paper copy, spray the patterned stock with clear lacquer or artist’s fixative. This makes the pattern lines easier to see and harder to rub off as you work.

**We used these tools and supplies**

**Stock:**
1x5 3/4x12" basswood, 3/4x2x18" pine for frame sides and ends, miscellaneous 1/2" pine for frame ornaments.

**Gouges:**

<table>
<thead>
<tr>
<th>No. 1</th>
<th>No. 5</th>
<th>No. 7</th>
<th>No. 9</th>
<th>No. 11</th>
<th>No. 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skew 3/16&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td>1/4&quot;</td>
<td>U-veiner 3/16&quot;, 3/16&quot;</td>
</tr>
</tbody>
</table>

**Bench knife**

**Finishing supplies:**
Acrylic artist’s colors: Titanium white, cadmium red medium, phthalocyanine blue, permanent green light, Mars black.
Walnut wood stain, gold-leaf kit
**Model Miss Liberty**

Stop-cut the pattern lines adjoining the orange-tinted background. This lowest relief level extends to the edge on each side. Start with stop cuts about 3/16-1/8" deep.

Begin cutting away the waste with a no. 5 or no. 7 gouge, about 3/16" wide. A bent gouge comes in handy for the tight areas between the crown points at the top and between the head and flag on the side. You also could use power-carving equipment in those spots.

Stop-cut the lines again, and carve deeper. Continue stop-cutting and removing waste wood until you reach a depth of 3/8". Keep the sides of the cuts vertical as you ground the plaque.

Next, stop-cut the pattern lines along the 1/4"-deep levels. Alternately stop-cut and remove material with the no. 5 and no. 7 gouges. On the open side, you can use the tip of your knife.

Similarly, ground the remaining levels. Leave the face and bangs at original-surface height. Note that the crown slopes from original...
height to \( \frac{3}{8} \)" deep. As for the crown points, take care to avoid chipping them at the ends.

Three sections indicated on the flag remain at original-surface height. At the fold lines, carve to about \( \frac{3}{8} \)" deep. Blend the folds into the flag's surface.

Sand out the tool marks to create a smooth surface for the waving flag. Elsewhere on the plaque, let the tool marks remain for a hand-hewn look.

Details add drama
On the face, stop-cut the bangs across the forehead. From just above the eyebrow lines, carve toward the hair, tapering to a depth of about \( \frac{1}{4} \)".

Stop-cut the eyebrow lines, the eyes, and sides of the nose. Then with a small V-tool, cut along the sides of the nose, the underside of the eyebrow lines, and the top and bottom of each eye. For each cut, hold the side of the tool nearest the pattern line vertical. Go about \( \frac{1}{4} \)" deep.

Next, stop-cut the lips and the nostrils. Cut away the surface around the lips, leaving them standing in slightest relief. (Before carving the lips, we reinforced the area by soaking the surface with cyanoacrylate adhesive.)

Blend the cuts around the eyes, beside the nose, and around the mouth into the rest of the face. The bridge of the nose, the lips, the forehead just above the eyebrow lines, and a portion of each cheek will remain at original height. Round over the sides of the face, then round the edges of the oval eyes and lips.

Cut the flutes in the crown with a \( \frac{1}{8} \)" no. 11 U-veiner. Chamfer the edges of the crown points. Then, with a \( \frac{1}{6} \)" V-tool, carve shallow vertical lines on the hair.

Texture the deepest relief layer with gouge cuts. First, groove the areas with a \( \frac{1}{4} \)" no. 7 or no. 9 gouge. Then, make random vertical cuts with a \( \frac{1}{8} \)" U-veiner. (In the areas we couldn't reach with the gouge, we used a hand-held rotary tool with a spherical cutter about the same size as the gouge.)

Carve a lasting motto
With Miss Liberty carved, turn your attention to the lettering. To form the raised letters, you'll cut away the wood surrounding them. (We carved \( \frac{3}{8} \)" deep around the letters on our plaque.)

Draw a pencil line across the bottom of the upper lettering area, about \( \frac{3}{8} \)" above the edge of the pictorial area. This line will form a raised edge, or rule, to separate the lettering from the central picture. Draw a similar line across the top of the lower lettering area.

Photocopy the lettering patterns. Center each between the rule and the end of the stock on the appropriate part of the plaque. Trace and fix the pattern lines as before.

Stop-cut the rule line and the letters at the top about \( \frac{1}{8} \)" deep. To stop-cut rounded parts of the letters neatly, pick a gouge with a sweep that pretty nearly matches the letter's curvature. Then, hold the gouge vertically, align it on the curve, and press it straight into the wood.

Keep the lines straight and the sides of the letters vertical as you carve away the background wood. Beware of the letters' serifs, the little curves at the ends of the strokes. They can break off easily, even with a carving this shallow. Soak them with cyanoacrylate adhesive to lessen the problem.

Texture behind the letters with a gouge. Shallow vertical cuts with a no. 9 gouge will help set off the lettering. Block-sand the letter faces and the rules.

Now, show your colors
Paint the plaque with acrylic artist's colors. Start with a primer coat of white for Miss Liberty and the flag.

Paint the textured areas behind the lettering phthalocyanine blue (known as thalo blue). Apply the liquid acrylic straight from the jar to the unprimed wood. If you use acrylic paint in a tube, thin it slightly with water for use. Paint the background and up onto the sides of the letters, but not the faces of the letters.

Trace the stars and stripes from the pattern onto the flag. Paint the star field thalo blue, leaving the white stars showing. Paint the stripes cadmium red medium. Put on two coats—more if needed—for a smooth, bright finish.

Before painting Miss Liberty, stain the gouge-textured background. Brush on walnut stain (we used Deft walnut no. 400), then blot away the excess. Stain the ledge above the statue's head.

For Miss Liberty herself, mix a few drops of permanent green light into light gray acrylic. (We mixed roughly three parts white and one part black for the gray.) Rub on copper undertones highlights.

A touch of gold
We applied gold leaf to the letter faces. Gold paint would work, too. We bought a gold leaf kit containing the sizing/adshesive and several sheets of composition gold leaf at a craft-supply store.

Frame and art-supply stores sell the kits, too.

Brush the sizing/adhesive onto the letter faces, as shown in Photo A below. Allow the sizing to dry, following any recoating instructions with your material.

Then lay pieces of gold leaf onto the sized area. Don't worry about covering each letter with a single
LIBERTY
JUSTICE
FOR ALL

piece; overlapping edges and wrinkles won't even be visible after you rub the leaf.

Rub the leaf smooth with your finger or a piece of soft cloth, as shown in Photo B. Whisk away the unadhered leaf with a small, stiff brush, as shown in Photo C. You can salvage some of the excess by lifting it with the tip of your carving knife. Apply a protective coating over the letters.

Continued on page 102
Oscillating Spindle Sanders Under $700 We put them to the test

For quickly and effectively smoothing curved edges, no tool matches the performance of an oscillating spindle sander. And although price used to be an obstacle to purchasing one of these machines, that's no longer the case. For this article we took a look at five models between $180–$700, and a $169 kit for drill presses. Here's what we discovered.

Six good reasons to buy an oscillating spindle sander

To truly appreciate the qualities of an oscillating spindle sander, you need to log some time using one. You'll be amazed at how fast and effortlessly you can smooth curved edges on woods as hard as oak and ash.

Unlike a drill-press sanding drum, the drum of an oscillating spindle sander has two simultaneous motions. As the drum spins at 1720–2000 rpm, it also goes up and down a distance between 1 1/8th–1 1/2" every second or two. This stroking motion makes for a huge improvement in performance over a drill-press setup. These advantages became apparent early in our testing:

1 Speed. Oscillating spindle sanders cut much more aggressively than a drum sander that's not moving up and down. That's because the oscillating motion constantly changes the area of the drum that's in contact with the workpiece edge. The stroking action also combats the tendency of the abrasive to load up with sanding debris.

2 Less burning. Since the drums don't load up quickly, you get less burning and glazing on sanded edges. You'll especially appreciate this attribute if you work with black cherry or maple.

3 Less effort. Because an oscillating sander cuts more aggressively, you don't need to apply as much force against the sanding drum. In turn, you have more control over stock removal. With less force against the drum, you also get an edge that's more square to the face of the workpiece. Why? A sanding drum may flex backward or contort under pressure.

4 No scoring. A sanding drum that doesn't move up and down will leave distinct scoring marks from its abrasive
grains. With an oscillating drum, these grains don’t rotate in the same plane so they leave a random pattern that’s less visible to the eye.

5 Portability. If you’re in a pinch for space, here’s some good news. Some of today’s oscillating spindle sanders can be stowed under a bench, or in some other out-of-the-way location. The Oscillating Sander Kit by GP Designs takes up no workshop space because it mounts on your existing drill press. (See the box on the following page for more information on this product.)

6 Dust collection. Any type of drum sander makes lots of superfine dust. Fortunately, most of the oscillating spindle sanders on today’s market have built-in dust collection. To find out how well the individual machines performed in this respect, see the section “Dust collection: These models cleaned up on the competition” on page 81.

An inside look at oscillating spindle sanders

After giving the tested machines a thorough tryout, we disassembled each of them to determine two things: 1) how they work; and 2) quality of construction.

• How they work. As you can see in the drawings right, three of the tested models—made by Clayton, Ryobi, and Vega—operate on a similar principle. These machines have two pulleys at the base of the spindle shaft. One of the pulleys—the one that drives the spindle shaft—makes fewer revolutions per minute (rpm) than the other pulley. This difference of 30–58 rpm (depending on the machine) forces the spindle up and down an equal number of times per minute because of a built-in circular ramp.

The Powermatic and Enlon models have mechanisms altogether different from the Clayton, Ryobi, and Vega. Here, the drive shaft has a threaded worm gear that rotates a pinion gear. In turn, the

Continued
OSCILLATING SPINDLE SANDERS

Pinion gear drives two rods up and down. These rods attach to a yoke assembly that forces the spindle shaft up and down.

Although similar in the way their oscillating mechanisms work, the floor-standing Enlon EN3407 and benchtop Powermatic 14 differ substantially in the size and durability of these assemblies. The Enlon has much beefier parts, and an oil bath that keeps its mechanical components running smoothly and with less wear.

**Quality of construction.** Our inspection and operation of these machines revealed big differences in the quality of construction. Here’s how each machine fared.

Not surprisingly, the most expensive machine in this review—the Clayton 146—was also the most sturdily constructed. The oscillating assembly has high-quality parts throughout, with the ramp mechanism in a sealed housing filled with oil. This unit will stand up to heavy use.

Typical of a Taiwanese-made machine, the Powermatic 14 extensively uses cast-iron and steel throughout its construction. We found the oscillating mechanism sturdy, but some of the parts appeared poorly machined. This didn’t create any obvious problems except that the threaded ends of the 1/4" and 1/2" drum shafts did not mate well with the spindle shaft. Because of this, these drums did not center well on the spindle shaft (a problem often referred to as "runout"). This caused the sanding surface to hammer the workpiece. Mark Seymour of Powermatic assured us that the machining of these parts has been improved and shouldn’t be a problem with current models.

The Enlon EN3407 amazed us by not only its sheer mass (about 300 pounds) but also by the quality of its mostly cast-iron components. We expected this machine to just be a larger version of the Powermatic 14, but it shares none of the Powermatic’s weak points.

Although it’s composed largely of lighter-weight metal and plastic components, the well-designed Ryobi OSS450 should stand up to the demands of most hobbyist woodworkers. The weakest point of this machine is its noisy universal motor. Typically, universal motors do not last as long in continuous-duty applications as the induction-type motors found on the other tested machines.

The Vega OS-3 proved to have the most disappointing construction of the units we tested. Although simple and easy to repair, the machine appears crudely made. Our model arrived with rusty pulleys; the ramp mechanism is encased in a piece of Schedule 40 PVC pipe like the type you would pick up at a corner hardware store. In operation, the entire spindle fell out of the machine when both spindle bearings loosened from their plastic retainers as we pressed a 2" sanding sleeve onto its drum. We tightened the retainers as much as possible, but the same problem persisted.

**Four things to consider when comparing tables**

To achieve quality results with 99 percent of your work, the table...

An oscillating sander kit for your drill press

With a price tag of $169, the Oscillating Sander Kit from GP Designs costs almost as much as the Ryobi OSS450. So why buy a drill-press kit when you can buy a dedicated sander? After trying the GP Designs unit, we came up with two good reasons for going this route.

First of all, you can have an oscillating spindle sander without devoting any extra shop space to one. Second, unlike dedicated sanders that operate at a fixed speed, you can change the speed of a drill press to suit the diameter of the sanding drum. We found this valuable since small drums (3/4"-diameter and under) sanded slowly on the dedicated units. With these small drums mounted in a drill press, we cranked the speed up to 3000 rpm for aggressive stock removal.

Our tests of the GP Designs kit were largely favorable. It took us about 20 minutes to install the unit on the Grizzly G1200 shown right. The stroke was adjustable between 1/8" and 3/8" by moving the clamp attached to the drill-press spoke. The connecting rod attaches and detaches in a second or two for switching between drilling and sanding operations. Included with every kit are well-designed plans for making a plywood dust-collection box that doubles as a table.

Our only knock against this well-made unit is the location of the on/off switch on the back of the motor housing. You cannot see the switch from an operating position, and reaching around to the back of the drill press proved awkward. The gear motor has its own power cord and plug.

The manufacturer supplies kits for most popular brands of floor-standing and benchtop drill presses. For more information about availability and accessories, call the phone number on page 82.
Dust collection: These models cleaned up on the competition

Both the Clayton and Ryobi units have 2½" dust ports for convenient connection to a shop vacuum hose. Hooked up this way, both machines provide for about 95-100 percent collection of the dust. These models work so effectively because both machines have dust-collection ducting that tightly surrounds the spindle just under the surface of the table.

As shown below, the Powermatic does a less effective job of dust collection because its ducting does not tightly surround the base of the spindle just under the table. Also, its undersized dust port does not connect to a common 2½"-diameter vacuum hose.

Like the Powermatic, the Enlon has a tilting table that inhibits the manufacturer from providing tight ducting around the spindle. However, the Enlon compensates for this limitation by having a 4" dust port for connection to a dust collector. Because dust collectors move larger volumes of air than shop vacuums do, a ducting system hooked up to a dust collector can be less than airtight and still work effectively.

The Vega unit provides no means of dust collection.

of an oscillating spindle sander should be solidly supportive, flat, smooth, and fixed at 90° to the spindle. On rare occasions you may need a table that tilts, so we'll also discuss this feature found on three tested machines.

1 Support. The chart on the following page shows you the size of each of the tables on our tested models. Keep in mind that the larger tables will provide better support for large workpieces.

2 Flatness. The tables on these machines should be flat to within about .015" across the diagonals of the table. Otherwise, you'll have a hard time sanding square edges. All of the machines passed this standard except for the Powermatic, with a "dished" center that measured .045" lower than all four outside edges. Powermatic's Mark Seymour told us that company officials recognize this problem, and the Taiwanese manufacturer has added a grinding step that will smooth the table considerably (see the next point), and make it flat to within a tolerance of .012".

Continued
### OSCILLATING SPINDLE SANDERS

**THE NITY-GRITTY ON 5 OSCILLATING SPINDLE SANDERS**

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>MODEL (t)</th>
<th>TYPE (d)</th>
<th>H.P. (d)</th>
<th>INPUT RPM (d)</th>
<th>R.P.M. (s)</th>
<th>MOTOR SIZE (s)</th>
<th>SPEED (s)</th>
<th>LEAD-WIRE (s)</th>
<th>OPTIMUM DIAMETER (s)</th>
<th>SPIRAL DIAMETER (s)</th>
<th>STANDARD DIAMETER (s)</th>
<th>STORAGE SPACE (s)</th>
<th>STORAGE SPACE (s)</th>
<th>PERFORMANCE</th>
<th>OVERALL</th>
<th>WEIGHT (lbs)</th>
<th>WARRANTY</th>
<th>COUNTRY OF ORIGIN</th>
<th>SELLING PRICE</th>
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<tr>
<td>CLAYTON</td>
<td>140</td>
<td>I-ODP</td>
<td>1/2</td>
<td>1750</td>
<td>30</td>
<td>1/8</td>
<td>1/8</td>
<td>9</td>
<td>3/4</td>
<td>3/4</td>
<td>3/4</td>
<td>Y</td>
<td>13/34x21</td>
<td>E</td>
<td>E</td>
<td>G</td>
<td>E</td>
<td>140</td>
<td>190</td>
</tr>
<tr>
<td>ENLON</td>
<td>EN3407</td>
<td>I-TEFC</td>
<td>1</td>
<td>1725</td>
<td>30</td>
<td>1/8</td>
<td>1/8</td>
<td>9</td>
<td>3/4</td>
<td>3/4</td>
<td>3/4</td>
<td>Y</td>
<td>13/34x21</td>
<td>E</td>
<td>E</td>
<td>G</td>
<td>G</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>VEGA</td>
<td>GS-3</td>
<td>I-ODP</td>
<td>1/2</td>
<td>1750</td>
<td>3-60</td>
<td>1/8</td>
<td>1/8</td>
<td>3</td>
<td>3/4</td>
<td>3/4</td>
<td>3/4</td>
<td>Y</td>
<td>12/34x16</td>
<td>E</td>
<td>N</td>
<td>E</td>
<td>F</td>
<td>695</td>
<td>695</td>
</tr>
</tbody>
</table>

**NOTES:**
1. (*) Same machine available with a 45°-high drum shaft as model 146 for $50 less.
2. (I-ODP) Induction, open drip-proof
   (I-TEFC) Induction, totally enclosed, fan cooled
   (U) Universal
3. Universal motors are typically rated according to amperage draw. Ryo ibi GSS/460 draws 3.5 amps.
4. (*) Torque per minute changed from 31 rpm under no load to 60 rpm under load.
5. (*) Model 140 has a 1/4-inch diameter spindle.
6. (*) Model 140 comes standard with 1/8, 1/4, 1/2, 1/4-inch diameter spindles.
7. (*) Model 140 has 1/4-inch diameter drums.
8. (*) Other sizes available by purchasing sanding drums from other manufacturers.
9. (* ) Cast iron
   (HDP-L) High-density particleboard - laminated covered
   (MDF-L) Medium-density fiberboard - laminated covered
   (S) Steel
10. (E) Collects 95-100% of dust
    (G) Collects 85-90% of dust
    (F) Collects 60-85% of dust
11. (E) Operates easily, locks solidly with accurate scale.
    (G) Smooth, easy to operate, scale not accurate.
    (F) Smooth, easy to operate, does not lock solidly.
12. (E) Easily visible and accessible, lockable.
    (G) Accessible, but hard to see and not lockable.
    (P) Controllable, hard to find, and easy to damage.
13. (E) 1-10 scale with 10 being the highest possible score.
14. (T) Taiwan
    (U) United States

### 3 Smoothness.

The Ryobi and Vega units have smooth tabletops made of wood-composite materials covered with a plastic laminate. Workpieces glide easily over these surfaces, as well as the finely finished steel surface of the Clayton machine and the cast-iron Enlon top. On the other hand, the Powermatic unit we tested had a roughly finished cast-iron top that created drag on the bottom side of our workpieces.

### 4 Tilting.

Of the tested machines, only the Clayton and Ryobi units do not have tilting tables. Unless you have a frequent need for a table that tilts up to 45° (we rarely do) we suggest you do not make this feature a deciding factor in choosing a machine. Why? As described in the section on dust collection on the **previous page**, tilting tables inhibited effective dust collection on some of the tested machines.

### A scoop from Sears

Just before this issue went to press we visited the engineering and testing facilities for Craftsman stationary tools. While there we got a sneak peek at a new oscillating sander set for sale in October. The $150 machine appears similar to the Ryobi, but has a direct-drive induction motor. The prototype looked promising, and we’ll have a complete test report in an upcoming issue.

### Recommendations

At the conclusion of our tests, the choices seemed pretty obvious. If you’re looking for the most oscillating spindle sander for the money, and have the available floor space, buy the Enlon. This heavy-duty machine is made to survive the long haul, and has power to spare.

However, many of us don’t have much floor space, and among the benchtop models we liked the Clayton and Ryobi units. The Ryobi gives the home hobbyist exceptional value. If you intend to use an oscillating spindle sander heavily, go for the Clayton (buy the model 140 unless you need the 9° drum height of the model 146). If you’re really tight on space, try the GP Designs kit.

### MANUFACTURERS’ LISTING

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Contact Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clayton</td>
<td>800/571-5050</td>
</tr>
<tr>
<td>Powermatic</td>
<td>800/248-0144</td>
</tr>
<tr>
<td>Enlon</td>
<td>800/248-2360</td>
</tr>
<tr>
<td>Ryoib</td>
<td>800/525-2579</td>
</tr>
<tr>
<td>GP Designs</td>
<td>800/222-8342</td>
</tr>
</tbody>
</table>

Written by Bill Kierer
Technical Consultant: Dave Henderson
Illustrations: Kim Downing
Photographs: John Hetherington
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Circle No. 75, 76, 77

Circle No. 57
A framework for Liberty

Miter-cut four pieces of 1/4"-thick pine 2" wide, to frame the carving. Fit these frame pieces, but do not attach them yet. Transfer the patterns for the top, bottom, and corner ornaments to 1/2" stock. (We used pine.) Scrollsaw them. Cut two of each corner piece, and flip one of each over for the opposite corner.

Sand all of the frame pieces and ornaments to 320 grit, rounding over the corners (except on mating surfaces). Stain the inside faces of the frame to match the textured area on the carving.

Attach the frame to the carving with brads and glue. Let the front edge of the frame stand out about 1/4" from the carving. To do this easily, lay the carving facedown on a couple of 1/4"-thick strips about 11" long as you install the frame pieces.

Set the brads and fill the holes on the outside of the frame. Sand the frame. Then, glue the top, bottom, and corner ornaments to the frame where shown. Clamp with rubber bands. Let dry, then stain the outside of the frame. Apply a clear finish.

Drive two #214 screw eyes into the carving’s back, about 3" from the top near each edge. Tie picture wire between them to hang your masterpiece.
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Dear Reader,

It's hard for me to believe, but this issue marks the 10th anniversary of WOOD® magazine, and our dedication to publishing the finest woodworking magazine anywhere. On this occasion, I'd like to personally thank you and the other 2.9 million readers for your loyal support during our first decade. And on behalf of all of us here on the WOOD team, I pledge to you our continued efforts in the years ahead.

WOOD magazine has evolved both graphically and editorially over the years, but our dedication to excellence has been a hallmark since the very first issue in September 1984. Our editorial mission has remained the same, too. "Our goal is to create an editorial product that serves the home woodworker better and more broadly than any competing woodworking publication and in more depth and singleness of purpose than the mechanics and how-to magazines. Specifically, it's designed to reach out to woodworkers and supply them with the kinds of ideas, information, and instruction that will help them improve their level of craftsmanship and, in the process, feel good about themselves and their hobby."

It is with this mission in mind that we conceive of, plan, research, write, and present every article that goes into the magazine. And, of course, it's why we shop-test all of the woodworking projects and techniques, and go out of our way to ensure that the information we present is fresh and up-to-date and of practical benefit to you as a home hobbyist woodworker.

Once again, thanks for your past support, and here's to a long, lasting relationship between us.

Best regards,

Larry Clayton
Editor

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